العنوان:	Maintenance Management for Airport Airfield Using MicroPaver Computer Software: Case Study
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Chapter One

Introduction

1.1 Background

The main purpose of maintenance management is to keep the facilities in Airfield running in full capacity and to be repaired as per the management system not only in case of broken or visible defect of the facility surface. These practices of maintenance will help in cost saving as long term view and plans.

Usually there are two types of maintenance first is the preventive maintenance this type scheduled to avoid any sudden failure or unexpected failure. The second type of maintenance is called corrective maintenance which is the most expensive. If not performed, it may cause excessive damage in the network.

Airports pavement in airfield usually design as flexible pavement or rigid pavement. The flexible pavement constructed with treated bituminous (treated surface) or thin layer of hot mix asphalt with high quality material to resist surface stress which caused by the aircraft loading wheels and to resist the erosion by environment. This black topped layer laid over base course and subgrade layer. The second type of pavement is called the rigid pavement which constructed from Portland cement concrete slab (PCC) or reinforced concrete slab. The difference between these types based on load distribution over subgrade: the rigid pavement has higher modulus of elasticity to distribute the load over wide area of subgrade.

In this study a Computer software was used for maintenance management which is widely used in airfield. Two combined software were used (Micro paver and Paveair) these two software created, funded and developed by United States Army Construction Engineering Research

Laboratory (USA-CERL) after agreement between Federal Aviation Administration (FAA) and United States Department of Transportation (USDT). Paveair software available online on FAA website.

1.2 Research Objectives

Research objectives to obtain, provide, establish maintenance management system for the airfield in an international airports as the follows:

1. Establish, construct solid data base for the airport facilitate include historical data, construction data, maintenance data …etc.
2. Evaluate the pavement conditions at airfield by systematic process as: including pavement inventory, assessment of the current pavement condition, and develop procedure to predict the future condition
3. Integrate Micro paver in airfield pavement system and to report the past and future performance of airfield pavement.
4. Establish maintenance management system for airfield and compare it with the current system by using the micro paver software and develop the scenario for maintenance and rehabilitation (M&R) based on budget or operational condition requirements.

1.3 Research Methodology

The research methodology is divided into four phases to achieve the research objectives and to complete the thesis:

- **Phase one** : literature review for relevant research, book, journal which is related to the maintenance management and the application of micro paver in airfield

- **Phase two** : data inventory and data collection for the runway and taxiway and other facilities inside the airfield (case study)
- **Phase three** : data analysis for the phase two
- **Phase four:** implementation and development the MMS for the selected Airfield Airport case study.

1.4 Case Study

The study was conducted on airfield pavement of international airport. The selected airfield contains: two parallel runways (south and north), fourteen taxiway (including high speed exit taxiway) and seven aprons which includes commercial apron, cargo apron and maintenance apron. Mainly Micro paver and Paveair softwares based on Pavement Condition Index (PCI). The PCI value based on distress types, severity and quantity of deterioration.

1.5 Related Research and Studies

This section shows briefly the related works and research which have focused on pavement maintenance management system for the airfield.

Gendreau and Soriano (1998) the evaluation performance procedure of airfield pavement in APMS is developed in 1970s by United State Army Corps of Engineer (USACE) as PAVER concept and capability. The evaluation process include some measure help in pavement management process such as: variation of PCI within section, rate of deterioration including any rapid degrading and causal factor of distresses (load, climate or other factor).

Greene et al (2004) assessment of the airfield pavement is important and essential for safe operation of aircraft and pavement performance. Condition assessment performed based on condition index include the PCI, foreign object damage potential index, structural index based on nondestructive test and friction index based on skid resistance measurement.

The PCI is a numerical value from 0 to 100 determined based on distress type, quantity and severity. The PCI also is a rating scale for the pavement: good, fair, poor.

The foreign object damage potential index is a scale from 0 to 100, with being 0 no foreign object potential and 100 high foreign object potential and the operation not allowed on that section of airfield pavement .The effect of these loose object on runway from pavement distress can cause serious damage to aircraft engine, causing costly damage and safety hazard.

Structural index mainly based on non-destructive test such as falling weight deflectometer. The result of structural index analyzed based on layered linear – elastic model and it calculated using computer software such as PCASE (Pavement Computer Assisted Structural Engineering) were developed and continually updated by United State Army Corps of Engineering. Output from PCASE software Pavement Classification Number (PCN) which represent the capability of pavement to support aircraft .Usually the Aircraft Classification Number ACN/PCN ratio used for evaluation criteria of structural index as following:

- Good: ACN/PCN ratio <1.1,
- Fair: ACN/PCN ratio between 1.1 and 1.4
- Poor: ACN/PCN ratio >1.4.

Larkin and Hayhoe (2009) the Paveair software is developed based on agreement between FAA and National Association of State Aviation Officials (NASAO) as nondestructive test to assess airport pavement condition. Paveair web based pavement evaluation and management program with equivalent function of Micro paver-5.

Federal Aviation Administration (FAA) – AC 150 / 5380-7B (2014) Airport Pavement Management System (APMS) consider systematic procedure for establishing and constructing policies, defining and setting the priorities, allocating the resources and determination of the budget requirement for pavement maintenance, rehabilitation or reconstruction.

The APMS provides agent or airport operator (maintenance division) by some recommendation to maintain the pavement network at acceptable level of service with minimum cost of maintenance.

The main purpose of APMS not only to evaluate the current condition of the airfield pavement, but also to predict the future condition of the pavement using the PCI. Once the prediction model for pavement generated the rate of deterioration and the life cycle cost analysis can be made to be used for the alternative of M&R. Also the optimal solution and time to apply the selected M&R to avoid higher cost of M&R in the future.

In general the pavement performance will reach to the critical condition after that the deterioration will increase rapidly. Thera are many factor that keep the pavement in good condition and before reaching the critical condition which consider the rapid deterioration point such the following factors: construction type, quality, pavement use and traffic, environment and maintenance. The following benefit of APMS are:

- Documentation of pavement data for current and future condition.
- Increase the useful life of pavement.
- Objective evaluation for pavement condition.
- Systematic procedure for budget determination and M&R alternative.
- Life cycle cost analysis for the M&R.

Humphries and Lee (2015) the main and primary objective of any aviation agency to ensure the airport operating safely. This goal depend on airfield pavement performance and ability to withstand for gross load and high tire pressure from aircraft. Pavement management is complicated and the knowledge in pavement type, treatment and requirements is needed from airport management.

PMS information include: indicator shows when pavement work is needed, cost information, benefit of treatment, pavement maintenance plans and the time frame of the applied treatment

1.6 Thesis structure

This thesis consist five chapter as following:

- **Chapter one:** this chapter will include introduction including the research problem, research methodology and research objective.
- **Chapter two:** this chapter will include a detailed literature review and previous works related to maintenance management in airport airfield.
- **Chapter three:** this chapter will include methodology, data collection and data analysis.
- **Chapter four:** this chapter will include development of proposed Maintenance management system and implementation.
- **Chapter five:** conclusion & recommendation.

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Chapter Two

Literature Review

2.1 Introduction

Maintenance management for airport airfield needed to support the engineering and management to provide safe and efficient operational facilities of airports. Since the airfield pavement consider as the first and most important facility in the airports. Due to the importance of airfield pavement all operation of airports will be effected in case of any damage or failure to the airport pavement. Also the pavement management system a broad function that use pavement evaluation and pavement performance trends as a basis for planning, programming, financing, and maintaining a pavement system.

Airfield pavement is complex structure of design also in construction, the pavement constructed to provide sufficient support of load generated by aircraft weight and to withstand without any damage due aircraft movements and traffic action. According to FAA the design theory of airport pavement was based on elastic theory of flexible pavement and three – dimensional finite element theory of rigid pavement. These two theories focused on the landing gear effect (FAA-AC 150/5320-6F).

The maintenance for airfield pavement and specially runway pavement decision in the past based on the previous experience of airport operator engineers or based on an urgent needed without any scientific or sophisticated method. This type of maintenance without any optimality of effectiveness consideration, later some agencies starts using note card for prioritizing the maintenance activity. But also this type found not effective for resource selection and maintenance strategies that used for airport pavement and for road pavement. (Kazda & Caves 2010)

2.1.1 Main Airport Airfield Characteristic

The main characteristic of airport airfield including the runway, taxiway, rapid speed exit taxiway and aprons the description of airfield is shown in the Figure 2.1.

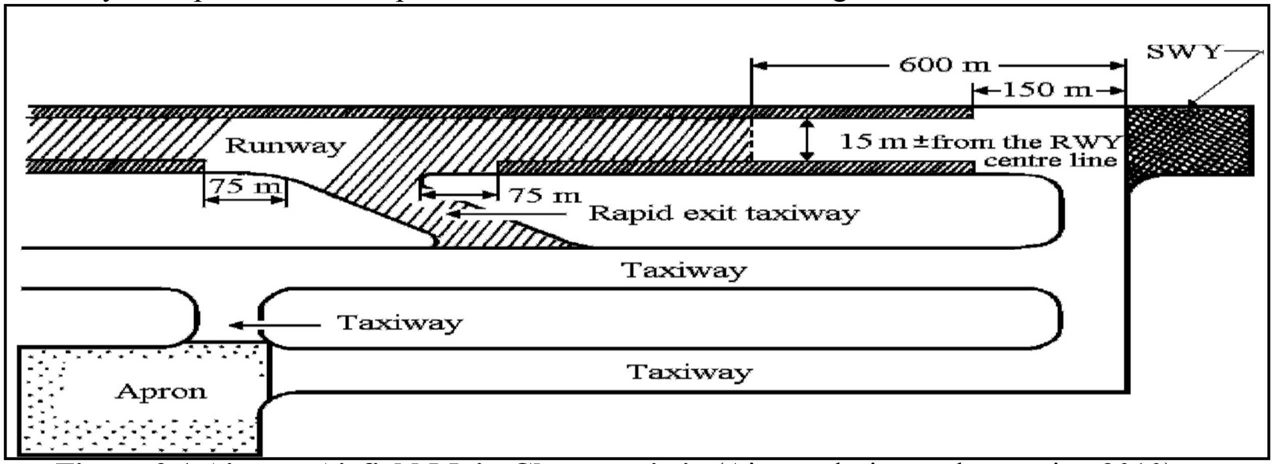

Figure 2.1 Airport Airfield Main Characteristic (Airport design and operation 2010)

Where SWY: Stop way of the runway

The following are the definition of each part of airfield:

1- **Runway**: define as the rectangular area on airfield land used for landing and take-off purpose and the runway it can be parallel, perpendicular, crossed, open V or extended V based on available lands orientation also the wind direction.

2- **Taxiway**: define as the path on an airfield land constructed and established for aircraft taxing form one part to other like apron, runway …etc

3- **Rapid speed exit taxiway**: the taxi way that connect to the Runway at specific angle and design to allow landing aircraft turn off higher speeds to minimize the runway occupancy and to move to the other taxiway that connected to aprons.

4- **Apron**: defined area on airfield land that used for different purposes like loading or unloading passengers, cargo, fueling, parking or maintenance.

5- **Stop way:** is an area beyond the runway which can be used for declaration in case of rejected take off (aborted takeoff).

2.1.2 Airport Types (Classification)

The airport classified in five category based on type of activity, these types & category include the following: commercial services, primary, cargo services, reliever, and general aviation airports and below the definition of each type. (Ashford, Mumayiz, and Wright 2011)

1. **Commercial services airport:** these airport that have at least 2,500 passenger boarding each year and received scheduled passenger services including two type non-primary for passenger boarding services between 2,500 and 10,000. And the primary airports for these airports have more than 10,000 passenger boarding each year. May be classified as international airport.
2. **Cargo service airports:** these airports that have total annual landed cargo weight more than 100 million pounds (45360 tons) in addition to transportation services.
3. **Reliever airports:** these airports that used to relieve congestion at commercial airports and to improve and help in general aviation access to the community. This type assigned by the aviation regulator and it can be public or private owned. May be classified as domestic airport.
4. **General Service's airports:** these type include the remaining types not included in the above and that have less 2,500 passenger boarding services each year. And these airport public or private owned. May be classified as utility airport.

The above definition as per the 1982 laws, the airport can classified bases on flight types like international or domestic flight. Also the airports can be utility airports for these airports that provide as example: emergency services, charter or critical passenger service, flight training and personal flying also it called basic airports.

2.2 History of Airport Pavement Maintenance System

The development of pavement maintenance system (PMS) started in 1968 by the USA-CERL by focusing on rehabilitation and repairing cost of pavement infrastructure in USA and developing the tools to help the decision maker and pavement agencies in cost effective management in M&R plans. Also the thinking of expert system started at that time. (Shahin et al 1987)

The M&R decision based on the experience & the engineering practice since 1985 the number of airports using the APMS around 84% and its start increasing after the new regulation which published by public law 103-305 for all airport that following the FAA regulation and its under federal funding they should show effective PMS . (Tighe and Covalt 2008)

The MMS in the past based on the experience without any economical calculation or aspect that taken into consideration for PMS and during M&R selection technique and regardless of life cost cycle or priority. So the purpose of PMS to manage the pavement network not to maintain it only if the M&R performed in the early stages around 50% of repair cost can be avoided.(Shain 2005)

The APMS for commercial airports described as “an airport pavement management system (APMS) can provide great benefits to a variety of groups, such as the engineering, maintenance, operations, finance, and upper management divisions at an airport “ . Also “that must be planned and addressed during the initial stages of its development for it to be successful.” . That mean the APMS is one unit for all airports teams and is complete set of procedure to be followed by them start from operator, airlines.. etc.   (Broten & wade 2004)

Recently most of the airports administration starts to issue and publish the guidelines for PMS and maintenance procedure as International Civil Aviation Organization (ICAO) which established in 1944 and also the procedure in FAA for pavement design, maintenance, evaluation and repair methods. Also as per the American Society for Testing and Materials (ASTM) standards and The American Association of State Highway and Transportation Officials (AASHTO).

2.3 Airport Pavement Types and Structures

The airport pavement structure it's different than the Highway structure its consists of surface layer (PCC or AC), base layer (stabilized or un-stabilized), sub-base layer and sub-grade layer all this layer constructed as per the FAA – AC 150/5370-10, Standards for Specifying Construction of Airports , Table 2.1 shows the typical specification for each airport pavement layers.

Table 2.1 Typical Pavement Specifications for Pavement Layers (FAA-AC 150/5320).

Pavement Layer	Flexible Pavement	Rigid Pavement
Surface Course	P-401/P-403	P-501
Stabilized Base Course	P-401/403 P-304 P-306	P-401/403 P-304 P-306
Base Course	P-209 P-208 P-211	P-209 P-208 P-211
Subbase Course	P-154 P-213 P-219	P-154 P-213 P-219
Subgrade	P-152 P-155 P-157 P-158	P-152 P-155 P-157 P-158

Where:

P-152: Excavation, subgrade and embankment Specification

P-154: Subbase course Specification

P-155: Lime- Treated subgrade Specification

P-157: Cement Kiln Dust (CKD) Treated Subgrade Specification

P-158: Fly Ash Treated Subgrade Specification

P-208: Aggregate Base Course Specification

P-209: Crushed Aggregate Base Course Specification

P-211: Lime Rock Base Course Specification

P-213: Sand-Clay Base Course Specification

P-219: Recycled Concrete Aggregate Base Course Specification

P-304: Cement-Treated Base Course Specification

P-306: Lean Concrete Base Course Specification

P-401: Hot Mix Asphalt (HMA) Pavements Specification

P-403: Hot Mix Asphalt (HMA) Pavements (Base, Leveling or Surface Course) Specification

P-501: Portland cement Concrete (PCC) Pavement Specification

The airport pavement is flexible pavement, rigid pavement or composite pavement consist the two type, the flexible pavement constructed with treated bituminous treated surface or thin layer of hot mix asphalt with high quality material. The rigid pavement which constructed from Portland cement concrete slab (PCC) or reinforced concrete slab, the third type is combination between these two types of pavement. (FAA-AC 150/5320 & FAA-AC 150/5380)

2.4 Obstacle Limitation Around Airports

The obstacle around the airport it shall be monitor and the airspace around the aerodrome to be maintained free from any obstacle that can prevent any landing or take-off for aircraft, all these obstacle to be taken and calculated for the master plan and for any future extensions that can be constructed around the airspace, all regulations in the world (aviation world) its follow specific procedures and standards like the procedure in ICAO – Annex 14 Aerodrome Design and Operations and the procedure in ICAO – Airport Service Manual part 6 - control of obstacle for obstacle limitation surface also some aviation agencies found and generate software for this purpose. (Annex 14 & airport service manual)

Figure 2.2 shows the area around aerodrome to be free from any obstacle inside and outside the airport as circle shape and all dimensions and slopes of obstacle limitation surfaces for the approach runways, more data available in Annex 14 - Aerodrome Design and Operations Table 4.1. Figure 2.2 shows the dimension and slope of obstacle limitation surface.

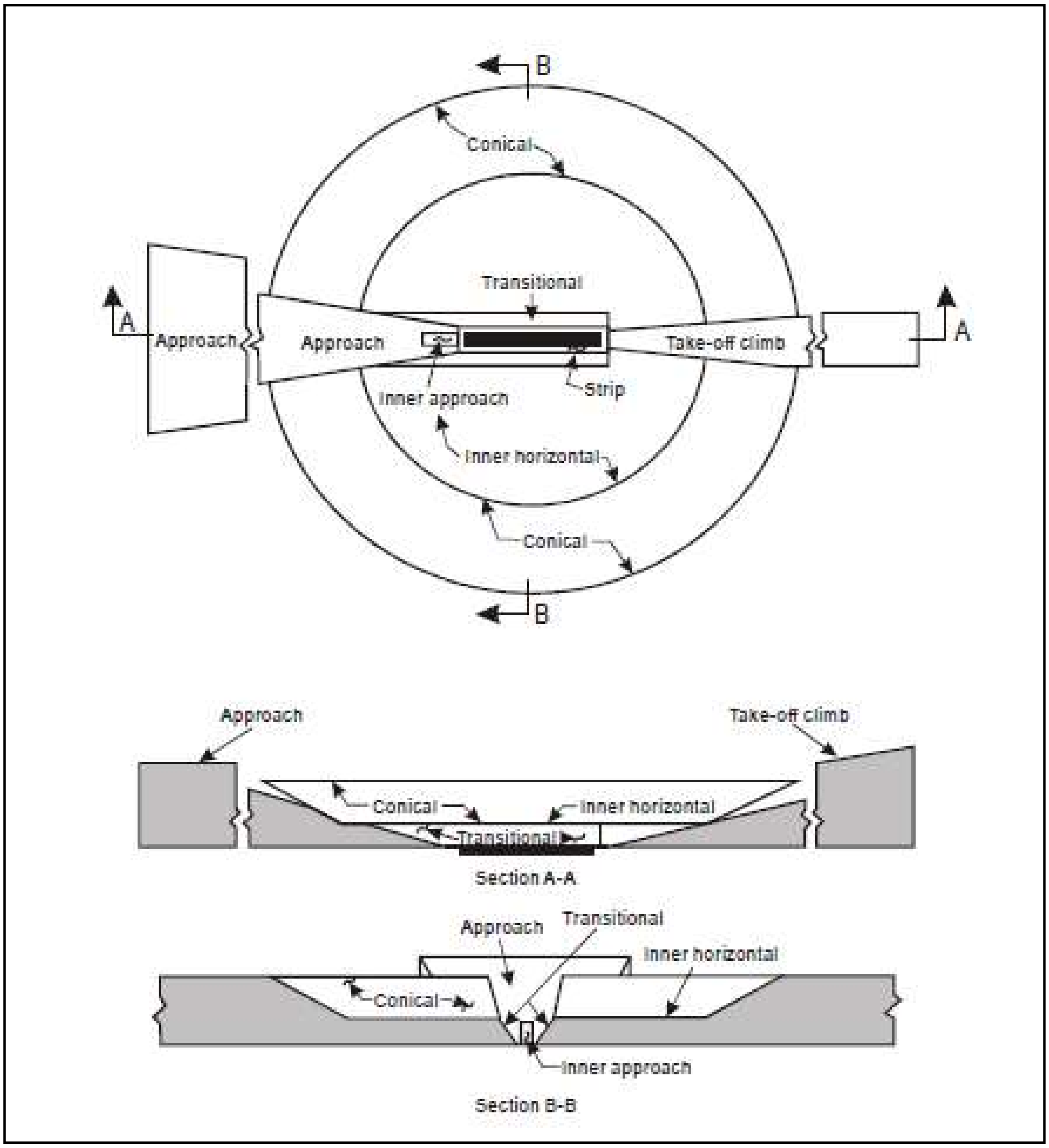

Figure 2.2 Obstacle Limitation Surface (Annex 14 Aerodrome Design and Operations)

Table 2.2 Dimension and Slope of Obstacle Limitation Surface (Annex 14 Aerodrome Design and Operations)

Runway Classification										
	Non instrument				Non-precision approach			Precision approach category		
								Cat I		Cat II or III
	Code Number				Code Number			Code Number		Code No.
Surface and dimensions	1	2	3	4	1,2	3	4	1,2	3,4	3,4
CONICAL										
Slope	5 %	5 %	5 %	5 %	5 %	5 %	5 %	5 %	5 %	5 %
Height (m)	35	55	75	100	60	75	100	60	100	100
INNER HORIZONTAL										
Height (m)	45	45	45	45	45	45	45	45	45	45
Radius (m)	2000	2500	4000	4000	3500	4000	4000	3500	4000	4000
INNER APPROACH										
Width (m)	-	-	-	-	-	-	-	90	120	120
Distance from threshold (m)	-	-	-	-	-	-	-	60	60	60
Length (m)	-	-	-	-	-	-	-	900	900	900
Slope								2.5%	2%	2%
APPROACH										
Length of inner edge	60	80	150	150	150	300	300	150	300	300
Distance from threshold	30	60	60	60	60	60	60	60	60	60
Divergence (each side)	10%	10%	10%	10%	15%	15%	15%	15%	15%	15%
First Section										
Length	1600	2500	3000	3000	2500	3000	3000	3000	3000	3000
Slope	5%	4%	3.33%	2.5%	3.33%	2%	2%	2.5%	2%	2%
Second Section										
Length	-	-	-	-	-	3600	3600	12000	3600	3600
Slope	-	-	-	-	-	2.5%	2.5%	3%	2.5%	2.5%
Horizontal section										
Length	-	-	-	-	-	8400	8400	-	8400	8400
Total Length						15000	15000	15000	15000	15000
TRANSITIONAL										
Slope (%)	20%	20%	14.3%	14.3 %	20%	14.3 %	14.3 %	14.3 %	14.3%	14.3%
INNER TRANSITIONAL										
Slope	-	-	-	-	-	-	-	40%	33.3%	33.3%

2.5 Levels of Pavement Management System

The pavement management system can be applied for two different levels from decision making perspective and there some software found to help the decision maker in their works as all expert system such as Micro Paver, Paveair and Paver 7, there two levels of PMS network and project. (Tighe and Covalt 2008, FAA-AC 150/5370-10G)

The following levels of PMS explained and descried briefly as follow:

1. Network management level

The network concentrate on the long term and short term budget need for the whole network condition including the present and future condition also to assist in prioritizing for section rehabilitation, reconstruction or maintenance based on the optimum alternative as well as it include the pavements to be considered at the project level, in this level using the expert system it will help in budget forecasting, and future condition predictions.

2. Project management level

The project management level made about the most cost- effective M&R alternative for the pavement which defined in the previous level of management analysis, each section should have new detailed condition survey in this level since the factor may change the optimum M&R strategy which established by decision maker, and this level may include multiple pavement section also different M&R action for different section, also the Expert system can be used based on the engineering measurement to specify the pavement condition also used to identify feasible alternatives that can correct existing deficiencies and current situation, after defining various alternatives with no action, then comparison based on a life-cycle cost, the results combined with budget and management constraints all these will produce the current year's maintenance and repair program.

2.6 Component of Maintenance Management system

The MMS needs continuous effort for condition data collection and updating the current situation in case we need to take the full advantage of MMS. The main components of MMS fall under two category database and system capabilities as shown in Figure 2.3 (FAA-AC 150/5370).

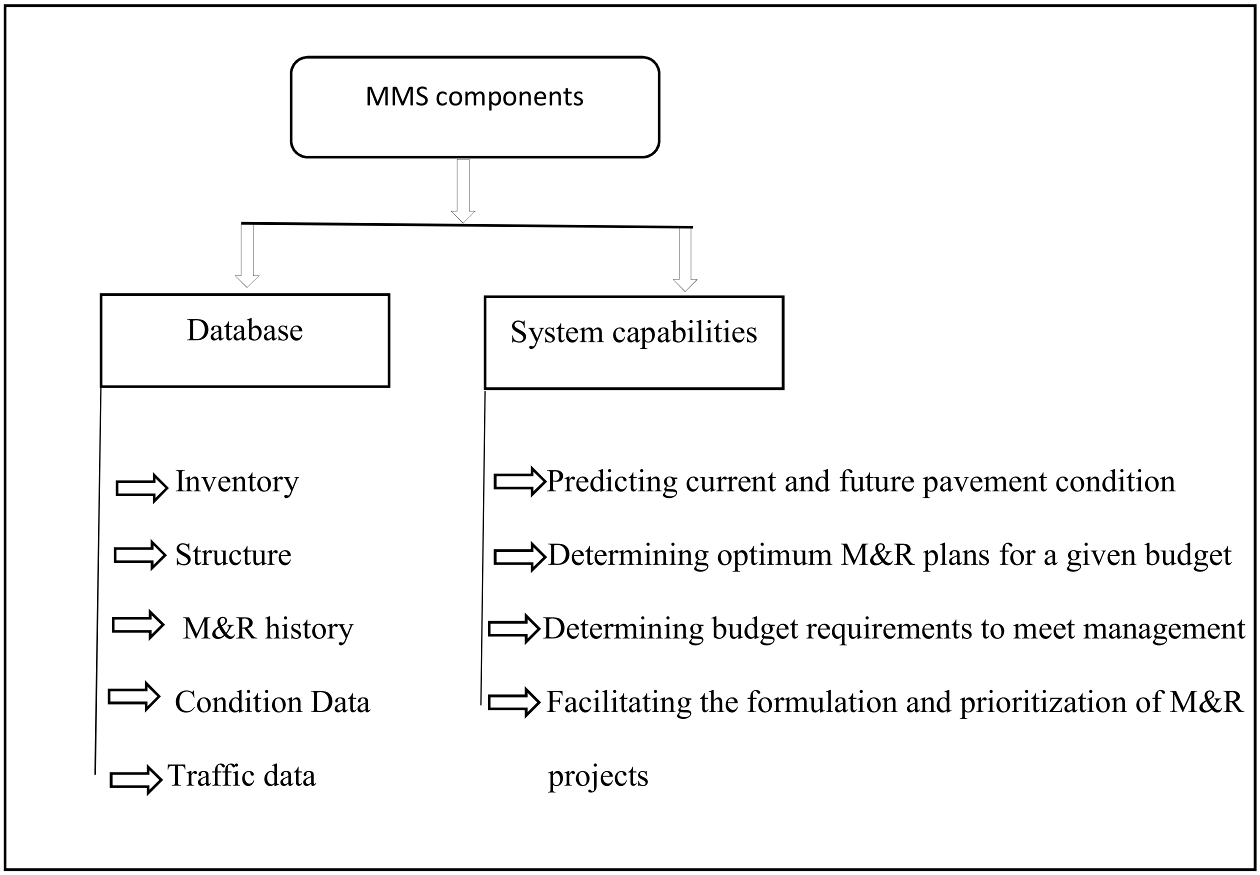

Figure 2.3 MMS Components

The following MMS component are explained as following:

2.6.1 Database

Data base contains some critical items that play a main role in good pavement M&R decision including the inventory, pavement structure, M&R history including cost also all data related to pavement condition and the traffic data, all these data to be as solid database for MMS.

1. Inventory

Inventory it consider the first step in the MMS to include the location of airfield data for the location of runways , taxiways and the aprons including the dimensions , construction date , last construction date , pavement types and all related maps .

2. Structure

Analyzing the Problem needs information regarding the pavement structure including the layer thickness, overlay if its included .All the information related to the pavement structure help in the analysis. Also in case of the information not available about layer nondestructive test can be used to determine the structural layer like Radar auscultation, Heavy Weight Deflectometer (HWD). Also these test help in determination of PCN.

3. M&R History

All M&R which performed to the airfield should recorded and kept in the database of MMS for both level of management and for each section. Also all data related to the preventive maintenance and routine work must be kept and tracked for all types of distresses, quantity and the cost of work performed to help the decision maker in M&R strategies.

4. Condition Data

Tracking pavement conditions consider as the fundamental component for any MMS or PMS one of the rating and tracking system PCI as per ASTM D5340. These standards include systematic procedure for pavement condition evaluation and rating for surface condition. These condition needs regular data collection for all types of distresses and include the continuous monitoring. (McQueen, and Timm 2005)

5. Traffic data

Traffic data for airport should be recorded and kept in database for the current aircraft numbers, types and the frequency .Also the prediction and forecast of any new type of aircraft should be taken in consideration for all aircraft types including the cargo aircraft since one of the main source for load effect on pavement from aircraft wheels. Figure 2.4 shows the aircraft wheels and the effect of the pavement surface.

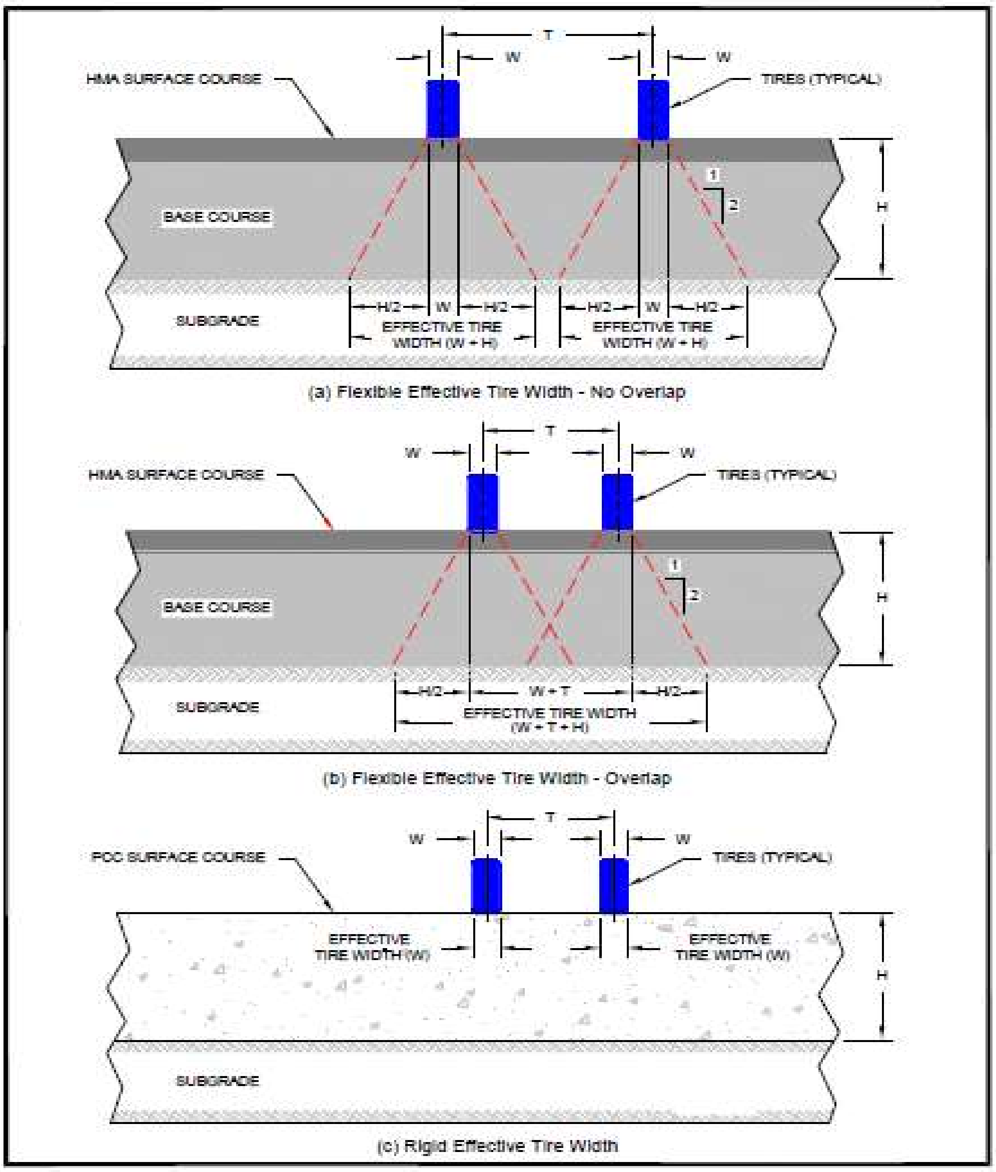

Figure 2.4 Aircraft Wheel Effect on Airfield Pavement (FAA-AC 150/5320- 6F).

2.6.2 System Capabilities

The second part of MMS component system capabilities it's include the prediction of current and future pavement condition , determining optimum M&R plans for a given budget , determining budget requirements to meet management and Facilitating the formulation and prioritization of M&R projects. (FAA-AC 150/5370)

The system capabilities are explained as follow:

1. Predicting of current and future pavement condition

Predicting of current and future condition of airfield pavement is essential and second step of MMS after database completion since it needed for optimum M&R plan and the prediction for future needed since the deterioration of pavement in continues change due to traffic load change and environmental change.

2. Determining optimum M&R plans for a given budget

Since the budget for M&R of airfield not open budget so the optimum M&R plan should be identified and where to be done and when it will be done also the approximation of cost needed if it can be estimated by the maintenance team .

3. Determining budget requirements to meet management

The budgets one of the top issue management and the decision maker are always looking for it and to minimize it. So determining the budget to meet management objective and maintaining the pavement with avoidance and eliminating to major M&R if it's possible over number of years.

4. Facilitating the formulation and prioritization of M&R projects

Developing optimum M&R plans at network level should include the setting for M&R projects prioritizing and formulation to meet the optimum M&R plans.

2.7 Evaluation of airport pavement

2.7.1 Pavement Evaluation components

The evaluation of airport pavement required four major keys which are strength, roughness, skid resistance and surface condition (distress measurement). The description of each key for airport pavement evaluation are explained as follow: (Tighe and Covalt 2008)

1. **Strength**

The airport pavement structure must be designed and performed to support the load which Caused by aircraft without any failure or distortion also it should be smooth, stable, free from dust, not generate any Foreign object debris (FOD) and usable in all reason of weather condition, The following list show the factor that can effect of the airfield pavement performance: (Ashford, Mumayiz, and Wright 2011)

a- Load variables such as :Aircraft gross load, Wheel load, Number and spacing of wheels, Tire contact pressures, Number of applications, Duration of load application, Distribution of lateral placement of loads, and Type of load (static or dynamic).

b- Environmental variables such as : Amount and distribution of precipitation (especially rainfall), Ambient temperatures, Aircraft blast and heat, and Fuel spillage

c- Structural design variables such as :Number, thickness, and type of pavement layers, Strength of materials

d- Construction variables such as quality and strength of material that used in the pavement construction.

e- Maintenance variables such as preventive maintenance program and corrective maintenance.

2. Roughness

The irregularity in airfield pavement surface considered as the measurement of airfield pavement roughness since the irregularities may cause damage to aircraft and effect the safe operation of airport .Also it may increase the structural fatigue to the airplane, the roughness for airfield it different than the highway roughness since the highway roughness it measured in terms of rid quality experienced by passenger and roughness impact reduced by the suspension system in vehicle .But in the aircraft the suspension system to absorb energy expanded during landing for that the airfield pavement roughness is defined of fatigue terms in aircraft and the safe operation of the aircraft (cockpit vibration). FAA divided the roughness in two category based on the dimension and frequency of surface deviations: single event bump and profile roughness each category describe in detail in the following. (FAA-AC 150/5380-9)

a) Single Event Bump

The single event bump defined if the change in pavement elevation happened in short distance around 100 meter or less as more difference from a planned pavement profile and usually it measured by basic analysis (straightedge) .

b) Profile roughness

Profile roughness defined as per FAA as the surface profile deviation shows and appears on a portion of runway that can cause or increase the fatigue to the aircraft component, reduce breaking action and effect the cockpit operation .Also cause discomfort to the passenger, there many factors that can effect on the response in case the roughness found like the aircraft type and the operational speed.

c) Roughness Software

The FAA establish and develop software for roughness calculation called ProFAA software available on FAA website (www.faa.gov), the software calculate the Boeing Bump index (BBI).

3. Skid Resistance

Airfield pavement it should be under continuous monitoring for the skid resistance due to the continuous flight that generate contaminants like rubber from aircraft wheels breaking or rolling on pavement surface that can affect the breaking action, directional control and friction. Generally it will affect the safety of aircraft specially in wet weather condition, and the runway friction will change with time depending on the aircraft type, frequency of landing , weather and environmental effects , addition to the contaminants like rubber deposits , dust , jet fuel , oil spillage ,snow and slush that can accumulated on pavement surface .For that the measurement of runway surface it should be in periodic and as per the regulation of FAA or ICAO usually the measurement of friction done on two speed 95km/h and 65 km/h and based on the continuous friction measurement equipment (CFME) there are two reading one it related to the maintenance planning level and the minimum that will use for operation level. Table 2.3 shows the friction level classification (FAA-AC 150/5320-12D)

From Table 2.3 and for the minimum acceptable reading for operation 0.34 on 95 km /h speed, and once the reading 0.47 the airport operator they shall start taking the maintenance activity into consideration since this reading it shows the maintenance planning level all these reading for the first type of CFME Airport Surface Friction Tester.

Table 2.3 Friction Level Classification. (FAA-AC 150/5320-12D)

	40 mph (65 km/h)		60 mph (95 km/h)	
	Minimum	Maintenance planning	Minimum	Maintenance planning
Airport Surface Friction Tester	0.5	0.6	0.34	0.47
Airport Technology USA Safe gate Friction Tester	0.5	0.6	0.34	0.47
Dynatest Consulting, Inc. Dynatest Runway Friction Tester	0.5	0.6	0.41	0.54
Findlay, Irvine, Ltd. Griptester Friction Meter	0.43	0.53	0.24	0.36
Halliday Technologies RT3	0.45	0.55	0.42	0.52
Moventor Oy Inc. BV-11 Skiddometer	0.5	0.6	0.34	0.47
Mu Meter	0.42	0.52	0.26	0.38
NAC Dynamic Friction Tester	0.42	0.52	0.28	0.38
Norsemeter RUNAR (operated at fixed 16% slip)	0.45	0.52	0.32	0.42
Tatra Friction Tester	0.48	0.57	0.42	0.52

The skid resistance and friction can be improved by rubber removal of runway surfaces, the rubber removal frequency its depends on landing flight numbers as per FAA and ICAO, these process it can be done by high pressure water vacuum machine , chemical , high velocity impact or mechanical grinding , the airport operator should conduct friction test measurement after rubber deposit removal .

4. Surface condition (Distress Measurement)

The airport pavement surfaces distress usually evaluated by PCI, The PCI consider as standard evaluation for airport pavement and it rating from 0 to 100 based on the quantity and severity of distresses for surface, and the distress based on the pavement surface type if it flexible or rigid pavement .(Hajek et al 2011).

The pavement deterioration causes are due to many factors such as: structural, climate (weather and /or environment), material, age or the combination of these factors.

The distresses are different for the each type of pavement as follows;

I. Flexible Pavement Distresses

The surface distresses for flexible pavement 17 type of distresses according to the paver distress identification manual and FAA Guidelines and procedure for maintenance of airport pavement AC-150/5380-6C , the distresses for flexible pavement in four major categories : cracking , Disintegration, Distortion and Loss of skid resistance.

1. Cracking

The cracking it comes in five types: alligator cracks (fatigue cracks), longitudinal and transverse cracks, joint reflection cracks, block cracks, slippage cracks and these types have different severity low , medium and high and it caused by different reason

2. Disintegration

The disintegration it comes in four types: raveling, weathering, jet blast erosion and patching, these types usually occurred by climate and quality of pavement surface layer like the adhesion between asphalt coating and aggregate particles, overheating of the mix or insufficient binder in the mix.

3. Distortion

Distortion types occurs in flexible pavement are five types: rutting, corrugation, shoving, depression and swelling. These types caused by many reasons in the layers underneath the aircraft wheels like but not limited to: foundation settlement, insufficient compaction layers, lack of stability in bituminous mix, bond issue between pavement layer also swelling of soil and frost action in the layers.

4. Loss of skid resistance

Loss of skid resistance it comes in three types: polished aggregate, bleeding and oil spillage, these types it can lead to hydroplaning and it can caused by repeated traffic, quantity of asphalt in bituminous mix too much , tack coat heavy , poor aggregate and paint.

II. Rigid Pavement Distresses

The surface distresses for rigid pavement 16 type of distresses according to the paver distress identification manual and FAA Guidelines and procedure for maintenance of airport pavement AC-150/5380-6C, the distresses for rigid pavement in four major categories: Cracking, Joint seal damage, Disintegration, and Distortion.

1. Cracking

The cracking comes in five types: longitudinal, transverse and diagonal cracks, corner break, durability cracks, shrinkage cracks, and shattered slab / intersection cracks .All these types have different severity level low, medium and high .Cracking caused by different reason.

2. Joint Seal damage

Joint seal damage is any condition or damage that enable deposit to accumulate in joint or allows significant penetration of water throw joint. These will prevent the slab from expanding it may cause shattering or spalling to the slab. The typical types of joint seal damage are: stripping of joint sealant, extrusion of sealant, weed growth, oxidation of filler, loss of bond with slab edge and lack of absence of sealant.

3. Disintegration

The disintegration it comes in eight types: scaling, Alkali-silica reaction, joint spalling, corner spalling, blowup, poputs, small patches and large patches. These types usually occurred by improper curing and finishing of concrete, improper mixing of the concrete and the quality of material using unsuitable aggregate.

4. Distortion

Distortion types occurs in rigid pavement its two types: pumping and faulting or settlement. These types change in pavement surface original position and it caused by many reasons like but not limited to: foundation settlement, expansive soil, frost effect or improper design of sub-drains or drainage system.

Appendix A shows detailed description for each type of distress

2.7.2 Measuring Quality of Airport Pavement

The evaluation of the pavement performance and measuring quality of the flexible and rigid pavement one of the following: Present Serviceability Index (PSI), Present Serviceability Rating (PSR) and Pavement Condition Index (PCI). Following description of each measuring type.

1. Present Serviceability Rating (PSR): the PSR is the rating for the pavement in of the five category from 1 to 5 as: 4.0 to 5.0 very good; 3.0 to 4.0 good; 2.0 to 3.0 fair; 1.0 to 2.0 poor; or 0.0 to 1.0 very poor. Theses number it shows the ability of pavement to serve intended traffic. And it's a user judgment and it given by panel of raters. This the simplest assessment method. (Irick, P., 1973).

2. Present Serviceability Index (PSI): the PSI is an algebraic function of PSR correlates include the variables that can observed by the present serviceability raters such as surface irregularity and defect that can be measured. PSI shows the coefficients that determined by multiple regression analysis and in the simple words PSR= PSI + E where E the discrepancy between the PSR and PSI. (Irick, P., 1973).

   There are two equation of PSI according to Yoder one for flexible and one rigid pavement as the following: (Yoder and Witczak 1975)

   a- Flexible pavement

   PSI= 5.03 – 1.9 log (1+SV) – 0.01 $\sqrt{C+P}$ – 1.38 $\overline{RD^2}$ ….Equation 2.1

   b- Rigid pavement

   PSI= 5.41 – 1.8 log (1+SV) – 0.09 $\sqrt{C+P}$ ………………. ….Equation 2.2

   Where:

   SV = Mean slope variance.

   C = Lineal feet of major cracking per 1000 ft^2 area.

   P = Bituminous patching in ft2 per 1000 ft^2 area.

   RD = Rut Depth in inches (both wheel tracks) measured with a 4 ft straightedge.

3. Pavement Condition Index (PCI): PCI measurement depends on the surface measured distress types, quantity and severities. PCI is numerical scale from 0 to 100 the procedure of PCI determination for airfield described in detail in ASTM -

D5340. PCI procedure include section dividing and sampling. After that the collection of distress start by walking over the sample unit for each section. The rating of pavement section lay with three category: good (PCI = 71 to100), fair (PCI = 56 to 70), and poor (PCI = 0 to 55). PCI can be customized to be seven categories: good, satisfactory, fair, poor, very poor, serious and failed. (ASTM-D5340)

This study will concentrated on measuring the quality of airfield pavement in airports based on PCI measurement.

2.8 Airport pavement Repair

The repair and treatment of airport pavement for flexible and rigid pavement as per common airport pavement maintenance practice by (Hajek et al) Table 3 and Table 4 include 38 types of treatment and repair for both flexible and rigid pavement and as per FAA Guidelines and procedure for maintenance of airport pavement AC-150/5380-6C Table 6-1 and Table 6-2 include numerous type of treatment and the cause of each type.

The different type of maintenance for airfield start from routine and preventive maintenance, corrective maintenance, rehabilitation and reconstruction based on PCI for airfield pavement. Usually PCI used as an indication for these types of maintenance. Figure 2.5 shows the typical pavement life cycle and the saving if the required maintenance of pavement applied on time that mean if the required maintenance delayed may be the airport will spend fourth or fifth times more than what will be spend if the required maintenance applied on time specially preventive and routine maintenance.

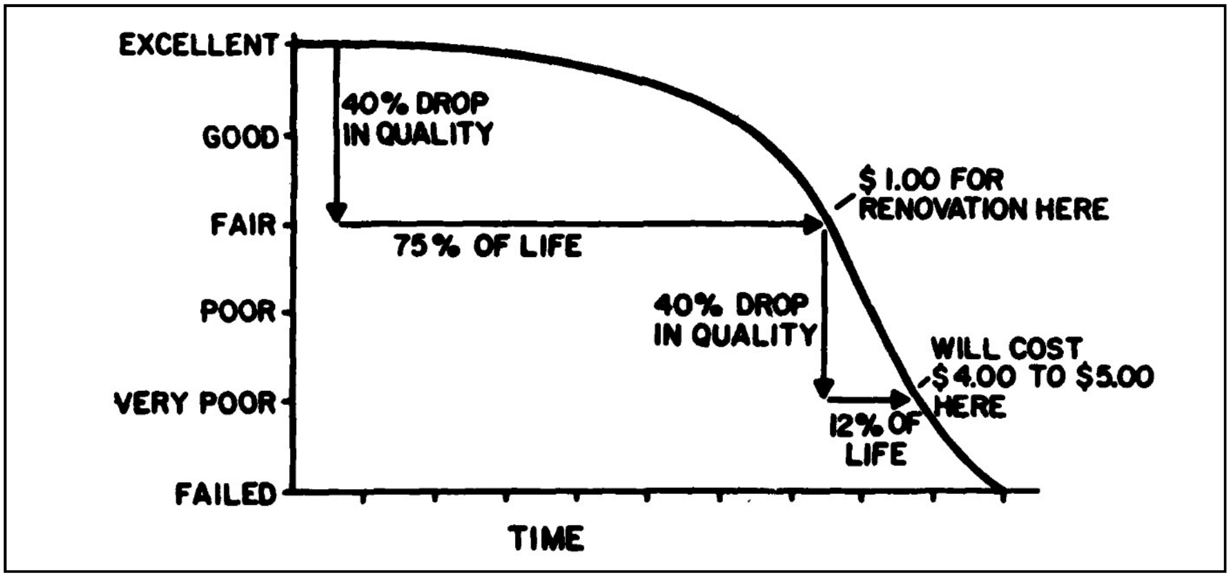

Figure 2.5 Typical Pavement Condition Life Cycle (Shahin 1987).

2.9 Previous Researches and Studies

This section will shows briefly the previous works and research which have focused on pavement maintenance management system for the airfield and maintenance management in general

Shahin , Cation and Broten (1987) The maintenance approaches M&R described as common approach which used by agencies with the following approaches: start with ad-hoc approach in this type the experience of staff (engineers and technicians) used and is consider as the available alternative for repair and usually the optimal solution will not be selected . The second approach present condition approach in this type the evaluation for facility under different condition indicators, and the selection of M&R alternative will be based on analysis of indicators. The third approach life cycle approach in this type the evaluation of M&R as the second type plus the future factor in consideration to ensure the most economical alternative selected as life cycle cost basis and the future factor it need repeatable scale such as PCI .

MMS components needs inventory for the network to include all data related to the facility and is consider as the first step in MMS also if it prepared correctly it will not repeated. Then data base establishing, network analysis and identify future inspection frequency also major M&R in future year to be connected with life cycle and future budget (future business plan).

Shahin , Stock and Beckberger (1994) The assessment of current and future condition for pavement network it shall be taken into consideration for any PMS before any preparation or evaluation for maintenance strategies and repair budget. At that time three M&R strategies was applied to the pavement section in the network also three family curves were developed for each type of M&R strategy. These curves technique relay on pavement construction concept subjected to traffic, climate and deterioration.

The development of M&R working plan needs certain procedure taking into consideration the pavement life and cost during the selection of best M&R strategy for each pavement section based on critical PCI concept as the following:

- Critical PCI identification for each family
- Assign appropriate M&R type to each pavement section for each year in the analysis period.
- Rank (prioritize) M&R requirement based on available budget and budget limitation.
- Calculate M&R cost, future PCI and backlog of M&R for each budget scenario.

Freeman & Dresser (1999) most of traditional ways of pavement maintenance it depend on surface evaluation but the PCI method it indicate both structural integrity and surface condition as per repeated procedure as the following: I) inspection to pavement surface to determine the type, quantity and severity level of pavement distress, II) determine deduct value, III) compute total deduct value (TDV), IV) adjust the TDV, V) compute PCI and finally determine the pavement condition rating.

Wade et al (2001) the main objective of any PMS to answer the airport management regarding the remaining life of the airfield pavement and when the rehabilitation work needed. There are several method used to indicate the reaming life such as: Design (traffic) based approach, PCI approach and mechanistic –empirical analysis approach.

In the PCI approach there are two method for reaming life estimation, the first method by evaluation of PCI over the time. The second one prediction of the PCI over the time by using performance prediction models. The first method consider as simply linear extrapolation of the average trend from construction date till the inspection date by applying equation 2.1 considering the PCI at construction 100 and shows the pavement deterioration rate or the total losses in PCI.

Deterioration Rate = (100-PCI) / (Inspection Date-Construction Date)….. ….Equation 2.3

The deterioration rate typically from 1 to 5, the low deterioration rate shows the more durable pavement and vice versa.

Kulkarni and Miller (2003) the PMS start in the earliest of 1970 based on simple data processing to evaluate and rank pavement rehabilitation project with no consideration for forecasting of future pavement condition. Also the time to shift from design and construction mode to maintenance and repair mode needed including the main following items which consider as the key element of PMS:

- Functions,
- Data collection and management,
- Pavement performance prediction,

- Economic analysis,
- Priority evaluation,
- Optimization,
- Institutional issues, and
- Information technology.

PMS have proved to be effective tools for optimum use of limited resources available for pavement maintenance and rehabilitation. Including the expectation for GPS and GIS use for image scanning and automatic interpretation technology to reduce and help in limited resource cases.

Tighe & Covalt (2008) the airport pavement evaluation based on four major components: pavement surface condition, strength of pavement include the all pavement layer, roughness include the raveling of pavement surface if it found and skid resistance. As pavement maintenance management there are two level: network level pavement management which involve in visual assessment only for pavement surface and the project level pavement management involve in other three component of pavement evaluation. These evaluation of pavement will lead to pavement management decision based on PCI. The PCI value is a ratting for pavement condition based on visual survey of the type of distress, severity and quantity on pavement surface with value start from 0 to 100. Taken into consideration the deterioration causes may be one of: structural, climate, material, age or combination of these factor. Also in case of rehabilitation or adding new part some item to be adjusted like maps, construction date, network definition, surface type and performance family assignment.

Thuma , Fuselier &Yip (2008) as the paper which related to major rehabilitation using the PCI data for international airport , and if the PCI less than 55 complete reconstruction work for pavement section needed depend of distress type the pavement section , functional and structural condition based on that rehabilitation approach can be selected partial depth patches, full depth patches, slab replacement or complete reconstruction , since the work inside constrained access the construction duration increased by 10 to 15 % for work and if the work during night only it will increase 25 % , all that will increase the repair cost at least 25% and usually after the work completion the PCI for these area improved to the acceptable level . Also based on these data major rehabilitation can be forecasted by comparing the actual PCI by forecast PCI.

HoronJeff , et al (2010) the total annual maintenance cost of good condition pavement is less than four to five times of the poor condition pavement. Since the deterioration of pavement condition indicator used in pavement management system to evaluate the current pavement condition. Future expectation and life- cycle cost analysis to select the most economical alternative. Also it was described the effective PMS component shall include mechanism system of data collection and storing for pavement condition , regular inspection for pavement condition , procedure for M&R , prediction mechanism of pavement serviceability and useful service life , procedure for cost estimation and comparison for maintenance alternative and optimal criteria for alternative selection.

The effective PMS is systematic procedure start form historical data of construction, regular site inspection and some test include non-destructive testing and direct sampling, ground penetrating radar and infrared thermography.

Ashford, Wright & mumayiz (2011) airport pavement consider as complex structural system , the performance of this system depend on some variable : load variable specially the aircraft load variable & mixed and not as constant load , environmental variables such as the jet blast & fuel spillage , construction variable and maintenance variable .

Method for classifying the load rating of aircraft and bearing strength of aircraft pavement called aircraft classification number / pavement classification fraction number (ACN/PCN) , the calculation of ACN/PCN its depend on the pavement type flexible or rigid pavement , the ACN expressing the severity of aircraft loading on a pavement for specified standard subgrade strength and the PCN expressing the bearing strength of a pavement under unrestricted operation , as operation wise if the ACN equal or less than PCN aircraft can operate without weight restriction on the pavement .

(FAA) – AC 150 / 5380-6C (2014) the drainage system and maintenance of the drainage system in airport play important role in performance of pavement and withstand the effect of weathers and traffic since it collects and removes the surface water runoff , protect the slopes from erosion and loss of the load-bearing capacity of the paved surfaces.

The effect of water for both flexible and rigid it will be shown if the drainage system not available or not adequate. The effects of these water will be in sublayer of pavement (base course, sub base), maintenance for the surface drainage & subsurface drainage is important and an improper maintenance can cause more damage to the pavement structure than if no drainage provided at all, because water directly responsible for many pavement failure or deterioration.

Pavement management system not for evaluation of pavement current situation only also it used for future prediction and by projection the rate of deterioration. PMS facilitate the life-cycle cost analysis for pavement maintenance & repair procedure and determination of optimal alternative.

(FAA) – AC 150 / 5320-6F (2014) the structural pavement evaluation of the airport pavement is systematic procedure including: records research, site inspection, pavement condition index, sampling and testing and the evaluation report. The following description and detail for each step.

1. Records research including the review of the construction date and history of the airfield pavement, design consideration, as-built drawing and maintenance history.
2. Site Inspection: include the visual inspection of the airfield pavement and examination of the existing drainage condition. Taking into consideration any effect of frost action and swelling soil.
3. Pavement condition index: PCI is a useful tool for airport pavements evaluation, the index can be as common basis for describing pavement distresses and comparing pavements.
4. Sampling and Testing: based on the site inspection and the needed evaluation reason the physical test and material analysis, Sampling and test provides general condition of the existing pavement structure.
5. Evaluation Report: the evaluation report shall include any finding and test result and became as permanent records. The Evaluation shall include any impact frost action, frost evaluation include the soil, moisture and weather condition.

(FAA) – AC 150 / 5320-12D (2016) the skid resistance of the airport pavement specially runway affected by number of factors such as: mechanical wear and polishing action from aircraft tires during the rolling and breaking action on runway pavement surface from the accumulation of the contaminants and rubber , These factor depends on the number of aircraft traffic and the local weather .So the maintenance for runway needed to increase the friction and skid resistance .Taking into consideration any structural failure such rutting , cracking , joint failure will increase the friction losses and consider as indicator of the distresses pavement.

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Chapter Three

Methodology, Data Collection and Data Analysis

3.1 Introduction

For establishing and constructing the MMS for airport airfield it need systematic procedures after constructing solid database for airport facilities. These steps and procedures discussed previously in chapter two. The methodology will be explained in this chapter for airport pavement that could be used for flexible pavement and rigid pavement using PMS expert system Micro Paver and Paveair as online software available on FAA website.

3.2 Research methodology

The systematic procedures as research methodology for establishing and implementation of PMS for airfield it consist the following steps: obtain maps, define network, data inventory, creation of database, collect condition data, develop condition deterioration models, verify data, obtain localized M&R unit cost, obtain global M&R and frequency of application, develop PCI versus cost models, perform condition analysis, perform work planning analysis, and formulate M&R projects and establish priorities. Figure 3.1 shows the above step in sequences then each step describe in detail in the following section. (Shahin, 2005)

The benefits and implementation of PMS as per agencies who have implement that system start with providing the necessary data for budget determination, maximize rate of interest (ROI) from M&R budget, create midterm business plan, setting the priority for needed maintenance, and justify M&R projects.

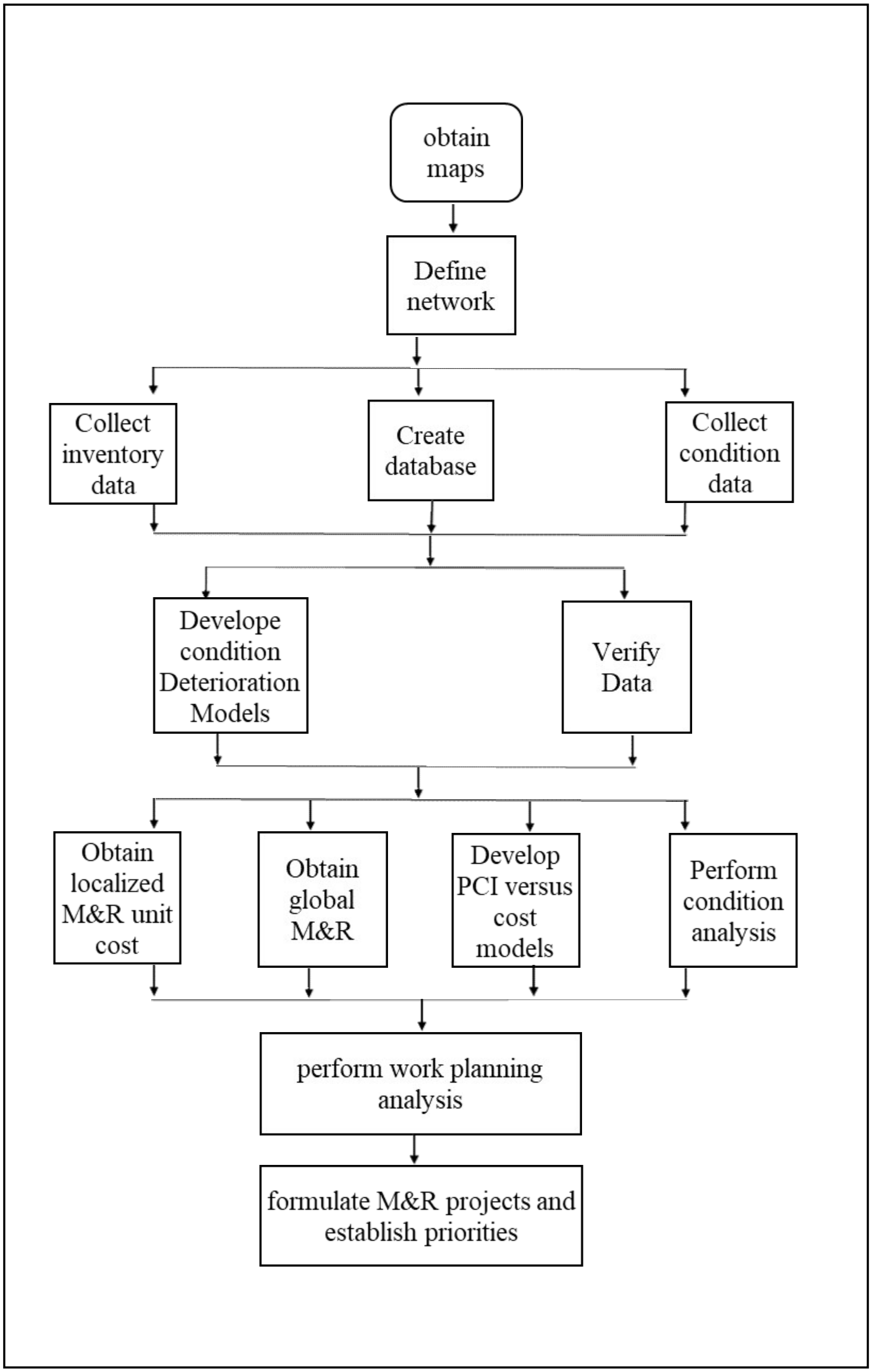

Figure 3.1 PMS Implementation Steps (Shahin, 2005)

3.2.1 Obtain maps

The first step in PMS obtaining maps or plans for the airport airfield that showing all pavement element include all the facilities of the airport include the drainage system, infrastructure, services..etc. These maps should be available in AutoCAD format for easy editing, modifying and adding some new references also to be used in Graphical Information System (GIS) referenced maps. (FAA-AC 150/5380, Shahin 2005)

3.2.2 Define networks

Define network of airport pavement by dividing the maps to networks, branches, section and samples. That include the type of pavement flexible or rigid and according to the uses such runway, taxi way or aprons. Also it divide according to the traffic load and according to construction dates and conditions (ASTM – D5340).

3.2.3 Collect Data Inventory

Data inventory collection it consider as the first block in APMS, the data of airport pavement should include the following:

- Branch use and identifications.
- Section dimension include the width and length.
- Section location it's within the courage way, shoulder, service area... etc.
- The pavement structure include the thickness and basic material properties.
- Drainage system characteristic and subgrade to show the presence of sub-drain and edge drain of airfield pavement.
- Environmental data (weather data).
- Pavement surface type.
- Pavement condition include the past and current condition.

- Traffic data include the aircraft movement numbers and aircraft types.
- Last construction date of the section , the LCD consider on of the most difficult data to be collected but it can be estimated from the PCI when it completed (Shahin 2005, Hajek et al 2011)

3.2.4 Create database

The database should include all data that collected in data inventory and the defined networks. Data base system will be used for data entry and presentation in future.

3.2.5 Collection condition data

Collection condition data should include all the surface pavement distress types. The distress type around 17 types of distress for the AC and 16 for PCC according to ASTM-D5340 and the severity of each type of distress, also the quantity of distress. All these data should be entered to the data base system.

3.2.6 Develop condition deterioration models

The techniques of developing pavement deterioration models available such as straight line extrapolation, regression, mechanistic-empirical, polynomial constrained lease square, S-shaped curve, probability distribution, and markovian (Butt et al 1994).

Another technique that can be employed is expert modeling approach as suggested by Zimmerman, This technique is generally used when there are not enough data to create an appropriate deterioration model. (Zimmerman 1996)

The primary models of deteriorations condition in micro paver are PCI against age and the most important factor LCD.

3.2.7 Verify data

All entered data to be verify to ensure its accurate and reasonable data that include all the above data related to the airfield from construction date till the inspection date.

3.2.8 Obtain localized M&R unit cost

Localized M&R is a temporizing activity performed on existing pavement to extend its serviceability and/or to improve ride ability. Localized M&R can be applied either as a safety (stop-gap) measure or preventive measure. Common localized maintenance methods include crack sealing, joint sealing, and patching. The unit cost is the cost of each type of localized M&R there around many types of localized M&R, and the effect of applying localized M&R on PCI.

3.2.9 Obtain global M&R and frequency of application

The global M&R is defined as the activated applied to the pavement entire section include the surface treatment with main objective to slow the rate of deterioration. Also taking into consideration the frequency of surface treatment. Unit cost should obtained from different surface treatment project for airfield.

3.2.10 Develop PCI versus cost models

The calculation and defining the cost models depend on the critical PCI for pavement since the calculation separated into two approach: the first approach if the pavement section below the critical PCI, the second approach if the pavement section above critical PCI.

Critical PCI define as "The PCI value at which the rate of PCI loss increase or the cost of applying the localized preventive maintenance increase significantly "(shahin 2005)

Figure 3.2 shows the typical critical PCI range and the deterioration curve, the usual range of critical PCI between 55 and 70.

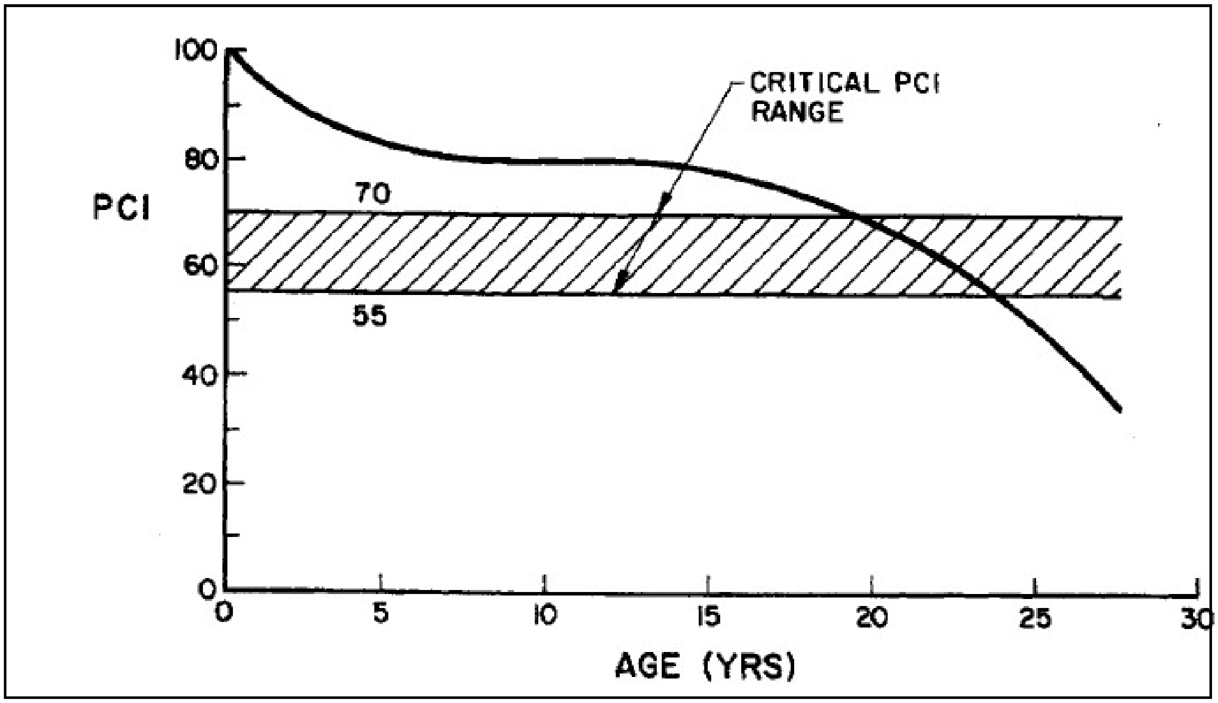

Figure 3.2 Typical Critical PCI Range (Shahin 2005)

The procedure of establishing and developing the value of critical PCI as the following:

1. Develop the family curve for pavement and visually selecting the critical PCI based on the rate of deterioration.
2. Selecting the localized preventive maintenance policy that will be used in the work plan development.
3. Applying the selected policy for the pavement section.
4. Plotting the cost of the localized preventive policy per unit area for each sections.
5. Select the PCI critical Value form step 1 to 4.

Figure 3.3 shows the calculation procedure for M&R cost of pavement section above critical PCI. First step start with structural distress. So if the pavement section with no structural distress the localized maintenance will applied as localized preventive maintenance using the preventive distress maintenance policy. And the extrapolated distress data from the last condition survey after that global preventive maintenance will applied based on user –specified interval between applications. The maximum number of application per section shall not be exceeded due to the global M&R the PCI for that section will increased accordingly.

The second branch if the pavement section with structural distress the cost determination of M&R based on PCI versus unit cost relationship. Then check the available funds and set the PCI to be 100 if the fund available otherwise we check the availability of fund in following years.

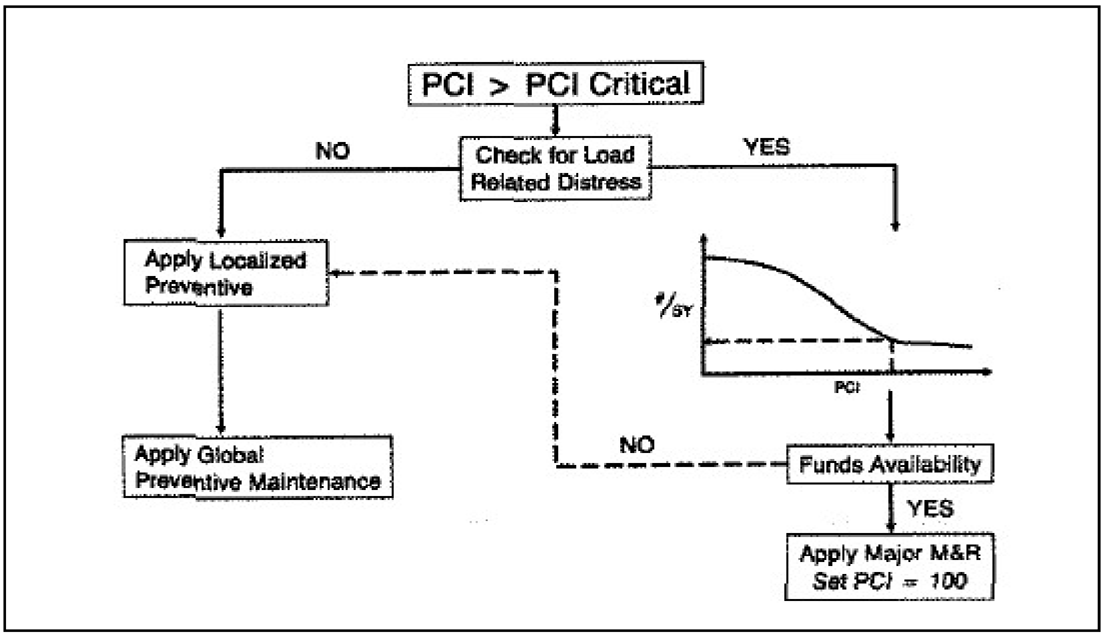

Figure 3.3 PCI Above the PCI Critical For Pavement Section (Shahin et al 1994)

Figure 3.4 shows the calculation procedure for M&R cost of pavement section below critical PCI. M&R cost determination based on the user –specified PCI versus unit cost relationship. Then checking the fund availability on basis of budget and priorities. If the fund available airport apply the major M&R and set PCI value to 100. And if the fund not available apply localized stop-gap maintenance (safety) and checking fund availability in the following years.

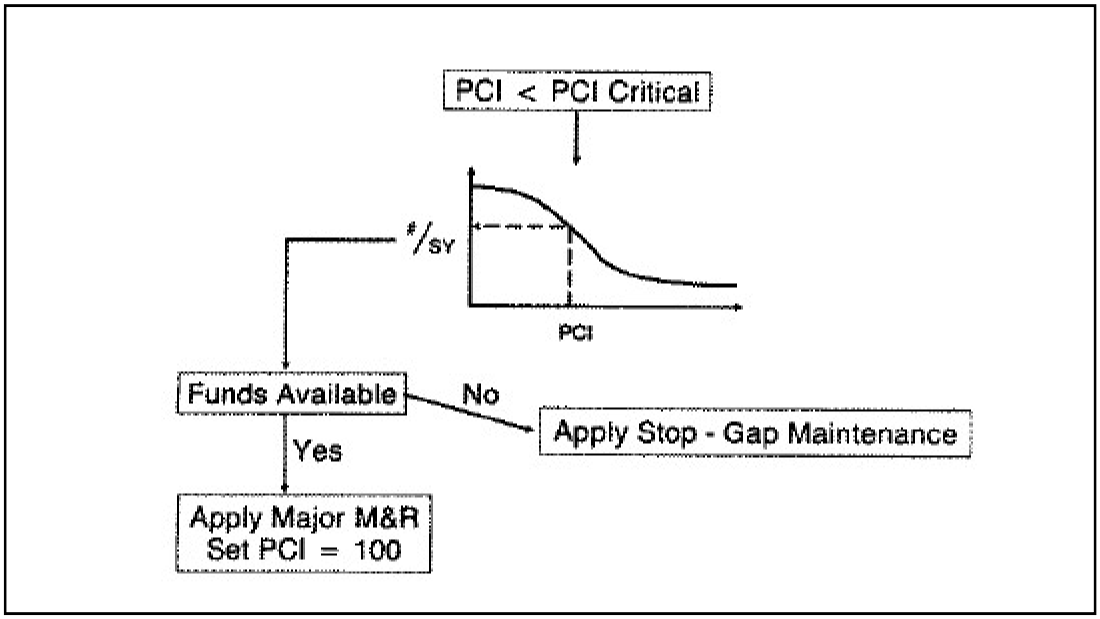

Figure 3.4 PCI Below the PCI Critical For Pavement Section (shahin et al 1994)

The cost models curve should applied for localized preventive M&R and major also for the localized safety M&R (stop-gap). This stop gap it mean the needed maintenance for the distress type to keep the pavement in safe and operational condition. Also the stop-gap applied for the pavement below critical PCI since is applied for high severity distresses and hazardous one.

3.2.11 perform condition analysis

The condition analysis preformed to show the pavement performance in the past also in future. And it plotted in graph or bar chart for easy understanding and the difference between both performance periods.

3.2.12 Perform work planning analysis

The work planning one of the most important item in the work of pavement management since it important in the following:

- Localized M&R program
- Stop- gap M&R
- Determination of optimum M&R category

- Determination of the budget requirement to meet the management objective and the budgeting takes in consideration the engineering and financial concerns. The mandatory safety, regulatory requirements and airport operational concern. Figure 3.5 shows the budget programming and establishing process.

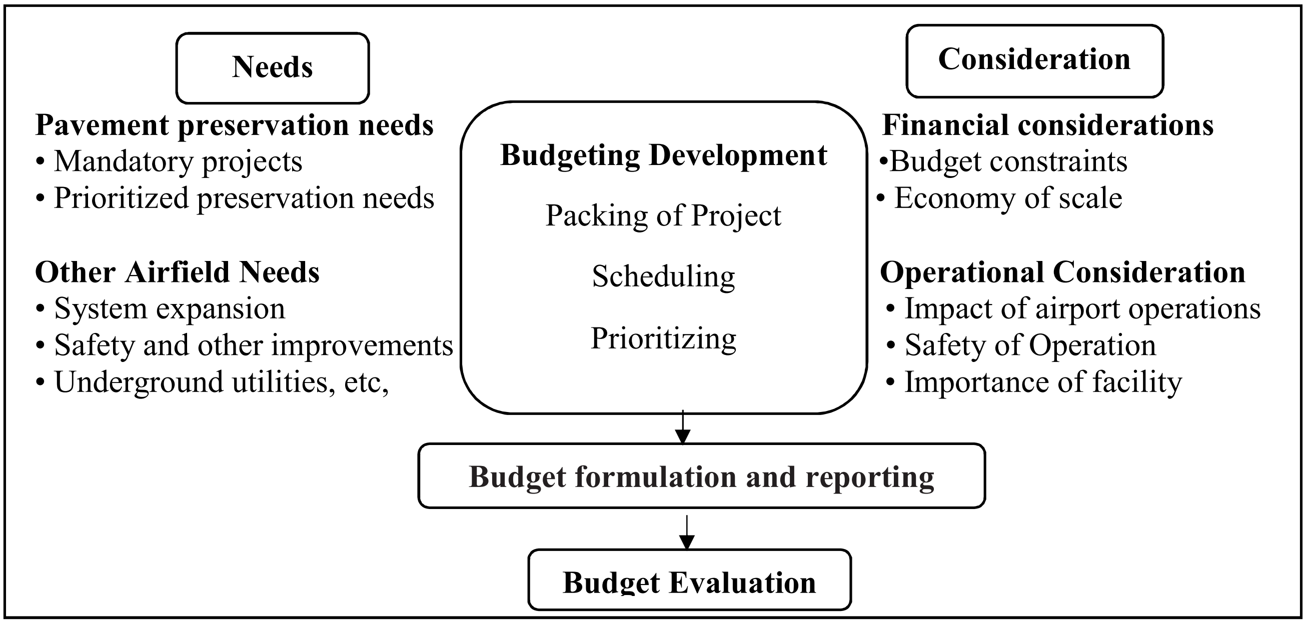

Figure 3.5 Budget Programing and Establishing Process (Hajek et al)

3.2.13 Formulate M&R projects and establish priorities

The prioritization of M&R projects is described for the two scenarios: short-term and long-term. Also in the setting of priorities the projects belong to runway and critical level have higher priority than other projects belong to the taxiway and cost effectiveness.

3.3 Micro Paver Software

The Micro Paver-5 pavement management system and the Paveair software are used in the analysis and as an automated pavement management system (PMS). This expert systems required for decision making as tool. And for the development of cost effective M&R alternatives for roads and streets, parking lots, and airfields. The micro paver provides many important capabilities, including and not limited to:

- Pavement network inventory
- Pavement condition rating
- Development of pavement condition deterioration models (Family Curves)
- Determination of present and future pavement condition (Condition Analysis)
- Determination of maintenance and repair (M&R) needs
- Analyzing the consequence of different budget scenarios (Work Planning)
- Project Formulation

3.3.1 Micro paver components and capabilities

The capabilities that provided by Micro paver as PMS software will be describe briefly including: inventory, prediction modeling, work planning, condition analysis, project planning and GIS interface (Paver 5 user manual)

1. **Inventory:** inventory management is based on a hierarchical structure consists all surface area that provide access ways for ground or air traffic, composed of networks, branches, and sections, with the section being the smallest managed unit. The inventory structure in this software allows users to easily organize their inventory while providing numerous fields and levels for storing pavement data. Taking into consideration the pavement network should be divided as per the ASTM D-5340 and FAA guidelines (Shahin et al 1987)
2. **Prediction Modeling:** the prediction modeling function helps identify and group pavements of similar construction that are subjected to similar traffic, weather, and other factors affecting pavement performance. Pavement condition historical data is used to build a model that can accurately predict the future performance of a group of pavements with similar attributes and condition based on PCI and LCD. Also the PCI can be customized as

per the user requirement comparing to the standard PCI range in software as shown in the Figure 3.6 which used in reporting analysis result.

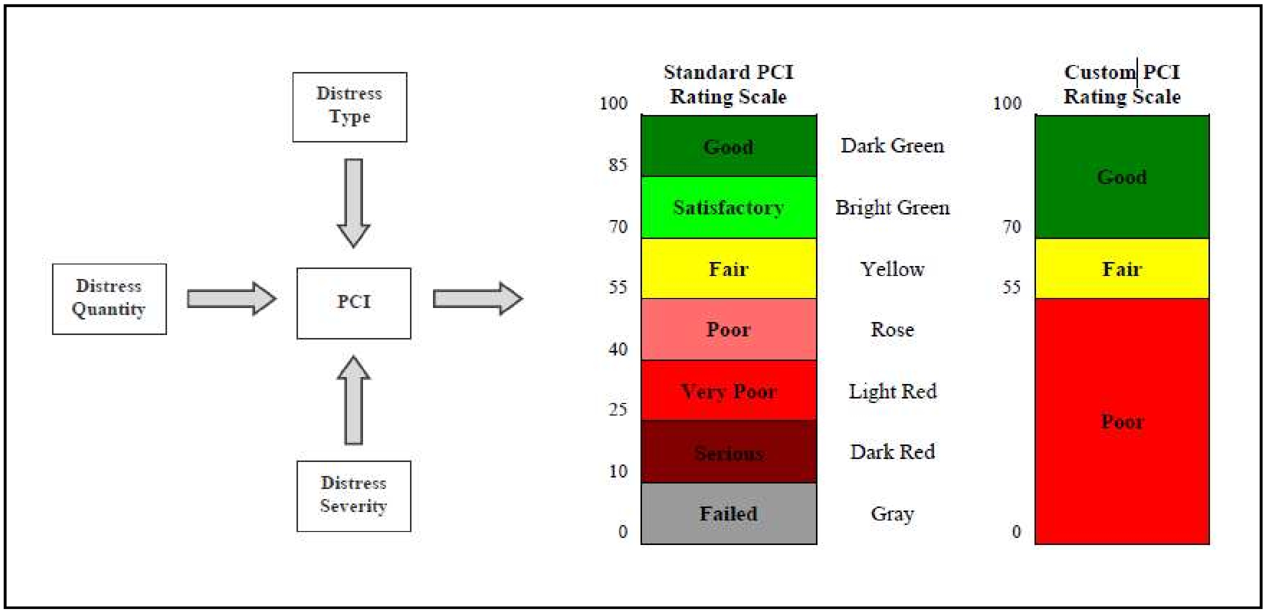

Figure 3.6 Pavement Condition Index Rating (Paver user manual)

3. **Work Planning:** is a tool for planning, scheduling, budgeting, and analyzing alternative pavement maintenance and repair (M&R) activities using M&R families. Based on inspection data, maintenance cost and prediction for future pavement condition .Also it used to determine how much funding is required to meet management requirement.
4. **Condition analysis:** is allow users to view the condition of the entire pavement network or any specified subset of the network including feature reports past conditions based on prior interpolated values between previous inspections and projected conditions based on prediction models.
5. **Project Planning:** it allows the user to plan project based on recommended work analysis and installation management priorities.

6. **GIS Interface:** it internal mapping capabilities to view GIS reports directly. Also it produce shapefiles of reports, such as inventory, inspection, condition analysis, and work plan, which can be viewed in other GIS software.

3.4 Case Study

The study was conducted on an international airport, this airport contain two parallel runways (south and north), Fourteen taxiway and seven aprons these aprons include commercial apron, cargo apron and maintenance apron. Once the first set of data have been collected (maps and historical data) the NATO (North Atlantic Treaty Organization) phonetic alphabet was used as abbreviations for taxiways and for the runways south and north used to identify the ID for each runway and for the apron. The apron divided as maintenance apron, cargo apron and commercial include: north apron old, north apron new, south apron old, south apron new, and hotel apron.

The survey data and site inspection for runway, taxiway and apron as per the ASTM –D5340 including the standard size range and the number of sample that to be inspected to provides 95% confidence level. The number of sample that vary depend on the available time, funds and manpower. Equation 3.1 can be used to determine the minimum number of samples:

$$n= Ns^2 / ((e^2/4)(N-1)+ s^2) \quad \text{Equation 3.1}$$

Where:

e = acceptable error in estimating the section PCI; commonly, e= ±5 PCI points;

s = standard deviation of the PCI from one sample unit to another within the section When performing the initial inspection the standard deviation is assumed to be ±10 for AC pavements and ±15 for PCC pavements

N = total number of sample units in each section, For random sampling and interval spacing of units the below equation 3.2 applied as per ASTM D 5340. The sample will be inspected throw equally space. The first sample chosen randomly this technique called ‘systematic random ‘formula rounded to the next lowest whole number:

i= N/n ………………………………………………………………… Equation 3.2

3.4.1 Runways

Runways include the south and north runway including the historical data for the runways, the sample size, number of sample as below for each runway.

I. South Runway

The South runway were constructed in 1980 with rigid pavements and in 2005 the rehabilitation was done, the runway surface was changed to flexible pavements. The south runway were overlaid by asphalt pavements layers. The length of runway 3660 m with 60 meter width as shown in Figure 3.7.

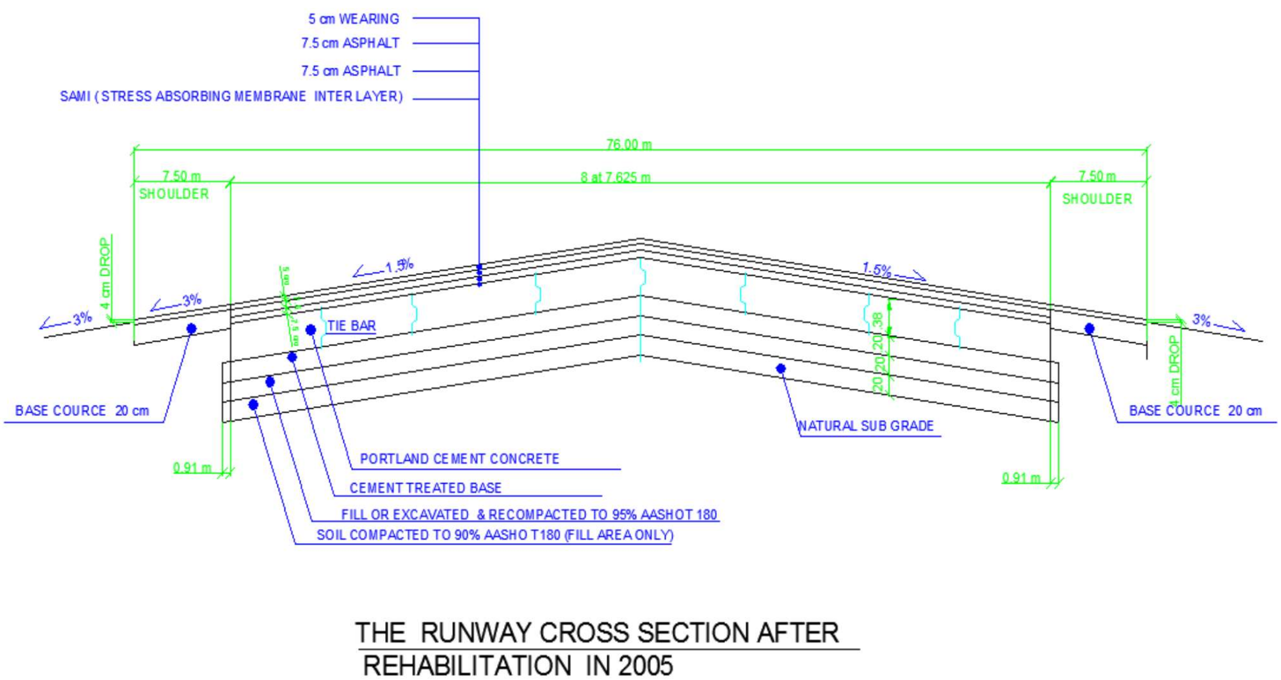

Figure 3.7 Typical Cross Section of South Runway

The pavements structure of the south runway consists CTB (cement treated base) layer, 39 cm PCC, and three layer of AC with total thickness 20 cm, and the SAMI (stress absorption membrane interlayer) was installed between AC layer and PCC. Also the section was divided into 366 sample each sample 60 m * 10 m to cover the whole runway

By applying equation 3.1 the N=366 unit, n= 16 and interval = 23 (by dividing N/n) all area in this section it divided as 600 m^2

II. North Runway

The north runway were constructed in 1990 with rigid pavements in the touch down zone and flexible pavement in the middle after that in 2009 the rehabilitation was completed. The north runway surface was changed to flexible pavements the north runway were overlaid by asphalt pavements layers. Also in 2017 reconstruction and rehabilitation for the north runway completed. The length of runway 3660 m with 60 meter width as shown in the Figure 3.8. The section was divided into 366 sample each sample 60 m * 10 m to cover the whole runway

By applying equation 3.1 the N=366 unit, n= 16 and interval = 23 (by dividing N/n) all area in this section it divided as 600 m^2.

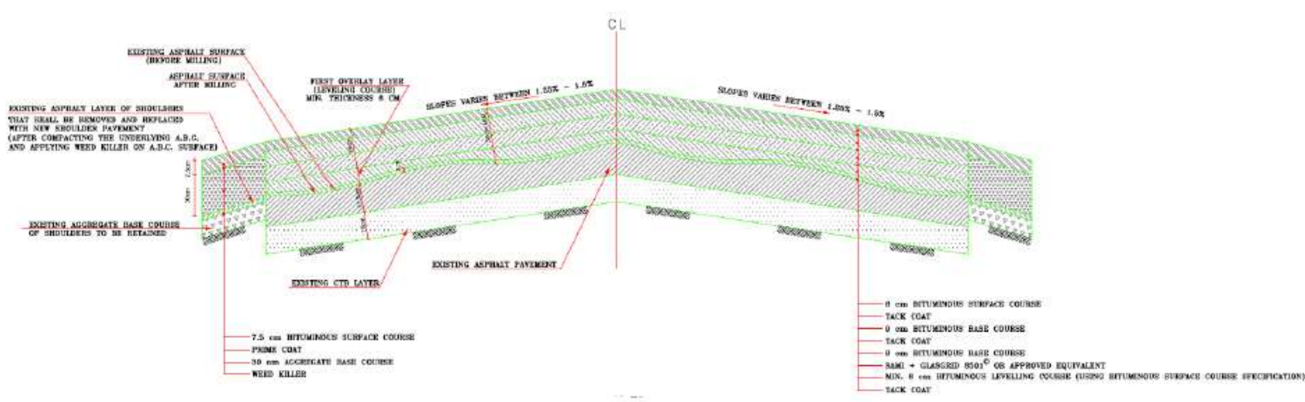

Figure 3.8 Typical Cross Section of North Runway

3.4.2 Taxiways

The taxiways include fourteen taxiways in the airfield which connect the north runway to the north apron and south runway to the south apron also some taxiways connect north side to the south side. These taxiways include the rigid pavement type (PPC) and the flexible pavement type.

I. Rigid Pavement Taxiways

The rigid pavement taxiway include five taxiway were constructed in 1980 include the taxiway Foxtrot, Golf ,Sierra , November and Eco with below pavement structure include the PCC , CTB and soil compacted layer as shown in Figure 3.9.

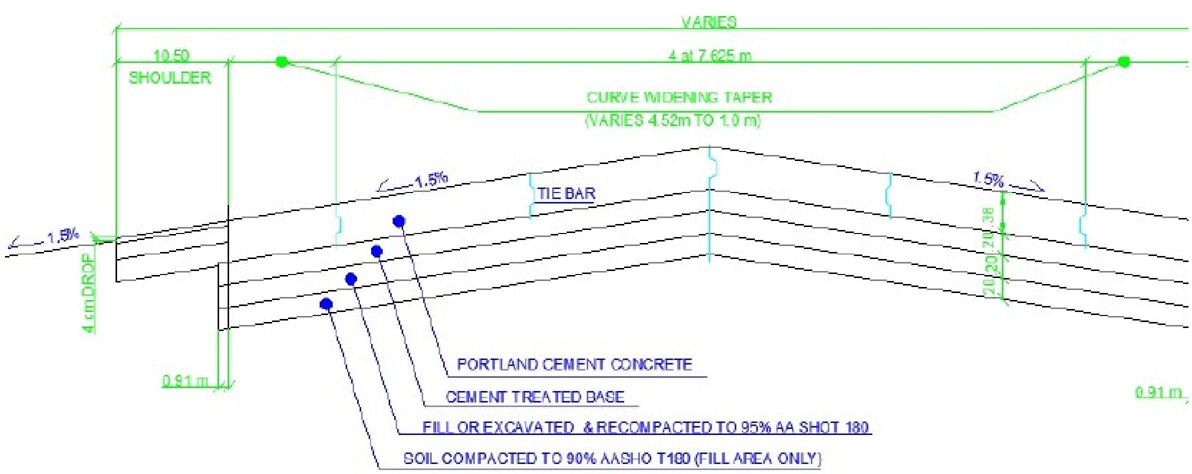

Figure 3.9 Typical Cross Section for Taxiway Rigid Pavement Section

The total number of slab for Golf and foxtrot taxiway 528 slab with 7.5 meter width and 7.5 m length for each slab. The section was divided into 33 sample each sample 16 slab to cover the whole taxiway, and by applying equation 3.1 the N=33 unit, n= 17 and interval = 2 (by dividing N/n) all area in this section it divided as 16 slab.

The total number of slab for November and Sierra taxiway 128 slab with 7.5 meter width and 7.5 m length for each slab. The section was divided into 8 sample each sample 16 slab to cover the whole taxiway, and by applying equation 3.1 the N=8 unit, n= 6 and interval = 1 (by dividing N/n) all area in this section it divided as 16 slab.

The total number of slab for Eco taxiway 72 slab with 7.5 meter width and 7.5 m length for each slab. The section was divided into 4 sample each sample 18 slab to cover the whole taxiway, and by applying equation 3.1 and due the small number or section whole taxiway inspected the N=4 unit, n= 4 and interval = 0 all area in this section it divided as 18 slab.

II. Flexible Pavement Taxiways

The flexible pavement taxiways include nine taxiways were constructed in 1980 and some of these taxiway rehabilitated in 2005 and the other in 2010. Include the following taxiways Alpha, Bravo, Charli, Delta these was rehabilitated in 2010 and the Juliet, Kilo, Lima, Mike was rehabilitated in 2005, in 2016 rehabilitation for taxiway hotel was done with below detail for each taxiway.

The total area of Alpha and Hotel taxiway 145089 m^2 for each taxiway with 35 meter width and 4145.4 m length. The section was divided into 282 sample each sample 514.5 m^2 with 35 m width and 14.7 length to cover the whole taxiway, and by applying equation 3.1 the N=282 unit, n= 16 and interval = 18 (by dividing N/n).

The total area of Charli, Delta, Kilo and Lima taxiways 22575 m^2 for each taxiway with 35 meter width and length around 500m. The section was divided into 43 sample each sample 525 m^2 with 35 m width and 15 length to cover the whole taxiway, and by applying equation 3.1 the N=43 unit, n= 12 and interval = 3 (by dividing N/n).

The total area of Bravo and Mike taxiway 8832 m^2 for each taxiway with 35 meter width and length around 250 m. The section was divided into 17 sample each sample 514.5 m^2 with 35 m width and 14.7 length to cover the whole taxiway, and by applying equation 3.1 the N=17 unit, n= 9 and interval = 2 (by dividing N/n).

The total area of Juliet taxiways 3360 m^2 with 35 meter width and 96 m length. The section was divided into 14 sample each sample 240 m^2 with 12 m width and 20 m length to cover the whole taxiway, and by applying equation 3.1 the N=14 unit, n= 8 and interval = 2 (by dividing N/n).

3.4.3 Aprons

The apron include seven aprons in the airfield which include the commercial aprons, maintenance apron and cargo aprons , these apron include the rigid pavement type (PPC) and the flexible pavement type as below detail.

I. Commercial Aprons

The commercial apron include five apron were some of these apron constructed in 1980 include the old north apron, old south apron these apron constructed with rigid pavement type and the hotel apron was constructed in 2006 with flexible pavement type and the other two apron new north apron and new south apron were constructed in 2012 below detail for each apron.

The total number of slab for old north apron and old south apron 1800 slabs with 7.5 meter width and 7.5 m length for each slab. The section was divided into 72 sample each sample 25 slab to cover the whole apron, and by applying equation 3.1 the N=72 unit, n= 24 and interval = 3 (by dividing N/n) all area in this section it divided as 25 slab.

The total number of slab for new north apron 1575 slabs with 5 meter width and 5 m length for each slab. The section was divided into 63 sample each sample 25 slab to cover the whole apron, and by applying equation 3.1 the N=63 unit, n= 23 and interval = 2 (by dividing N/n) all area in this section it divided as 25 slab.

The total number of slab for new south apron 1600 slabs with 5 meter width and 5 m length for each slab. The section was divided into 64 sample each sample 25 slab to cover the whole apron, and by applying equation 3.1 the N=64 unit, n= 23 and interval = 2 (by dividing N/n) all area in this section it divided as 25 slab.

The total area of hotel apron 43750 m^2 with 125 meter width and 350 m length, the section was divided into 70 sample each sample 625 m^2 with 25 m width and 25 m length to cover the whole apron, and by applying equation 3.1 the N=70 unit, n= 13 and interval = 5 (by dividing N/n).

II. Cargo Aprons

The cargo apron was constructed in 1980 with rigid pavement type and the total number of slab for cargo apron 704 slabs with 7.5 meter width and 7.5 m length for each slab. The section was divided into 44 sample each sample 16 slab to cover the whole apron, and by applying equation 3.1 the N=44 unit, n= 20 and interval = 2 (by dividing N/n) all area in this section equal.

III. Maintenance Aprons

The cargo apron was constructed in 1980 with rigid pavement type and the total number of slab for cargo apron 1050 slabs with 7.5 meter width and 7.5 m length for each slab. The section was divided into 42 sample each sample 25 slab to cover the whole apron, and by applying equation 3.1 the N=42 unit, n= 19 and interval = 2 (by dividing N/n) all area in this section it divided as 16 slab.

Table 3.1 and Table 3.2 summarize the equation 3.1 and shows the total number of sample unit in each section (N), interval (i), the minimum number of sample (n) should be inspected, area of sample size, and the total section area for flexible pavement. For rigid pavement the slabs number added to the Table 3.2.

Table 3.1 Number of Samples for Flexible Pavement

No	Section Name	N	n	i	Sample area (m^2)	Total Section area (m^2)
1	South RWY	366	16	23	600	219600
2	North RWY	366	16	23	600	219600
3	Alpha TWY	282	16	18	514.5	145089
4	Bravo TWY	17	9	2	514.5	8832.25
5	Charli TWY	43	12	3	525	22575
6	Delta TWY	43	12	3	525	22575
7	Juliet TWY	14	8	2	240	3360
8	Hotel TWY	282	16	18	514.5	145089
9	Mike TWY	17	9	2	514.5	8832.25
10	Kilo TWY	43	12	3	525	22575
11	Lima TWY	43	12	3	525	22575
12	Hotel Apron	70	13	5	625	43750

Table 3.2 Number of Samples for Rigid Pavement

No	name	N	n	i	Sample area (m^2)	Total Section Area (m^2)	Number of Slabs in sample
1	Eco TWY	4	4	0	4050	4050	18
2	Foxtrot TWY	33	17	2	15300	29700	16
3	Golf TWY	33	17	2	15300	29700	16
4	November TWY	8	6	1	5400	7200	16
5	Sierra TWY	8	6	1	5400	7200	16
6	South Apron old	72	24	3	33750	101250	25
7	South Apron New	64	23	2	14375	40000	25
8	North Apron old	72	24	3	33750	101250	25
9	North Apron New	63	23	2	14375	39375	25
10	Maintenance apron	42	19	2	26718.75	59062.5	16
11	Cargo Apron	44	20	2	18000	39600	16

Figure 3.10 shows the total number of sample in each section and number of sample inspected in each section.

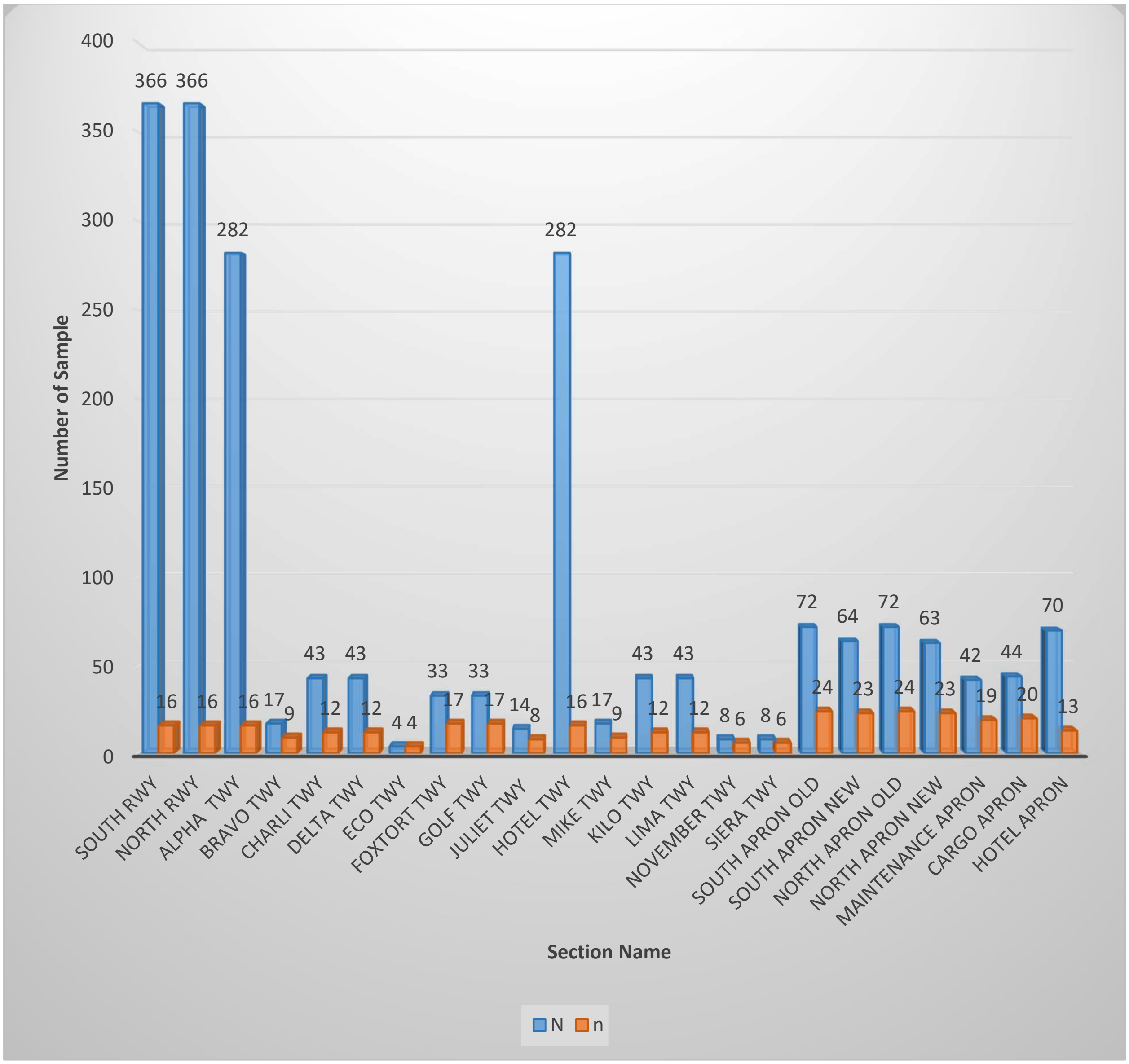

Figure 3.10 Number of Samples Inspected in Each Pavement Section

3.4.4 Data Component

The data inventory and first set of data for the whole airfield summarized and explain in following Table 3.3. More detail for the each runway, taxiway, and apron also the area of each section, number of inspected sample, branch and surface type.

Table 3.3 Airfield Summarized Data

No	name	Total area (m^2)	Total Number of sample	Number of inspected Sample	Sample area (m^2)	Branch	surface Type	Last construction date
1	South RWY	219600	366	16	9600	RWY	APC	2005
2	North RWY	219600	366	16	9600	RWY	AC	2017
3	Alpha TWY	145089	282	16	8232	TWY	APC	2010
4	Bravo TWY	8832.25	17	9	4630.5	TWY	APC	2010
5	Charli TWY	22575	43	12	6300	TWY	APC	2010
6	Delta TWY	22575	43	12	6300	TWY	APC	2010
7	Eco TWY	4050	4	4	4050	TWY	PCC	1980
8	Foxtrot TWY	29700	33	17	15300	TWY	PCC	1980
9	Golf TWY	29700	33	17	15300	TWY	PCC	1980
10	Juliet TWY	3360	14	8	1920	TWY	AC	2005
11	Hotel TWY	145089	282	16	8232	TWY	AC	2016
12	Mike TWY	8832.25	17	9	4630.5	TWY	AC	2005
13	Kilo TWY	22575	43	12	6300	TWY	AC	2005
14	Lima TWY	22575	43	12	6300	TWY	AC	2005
15	November TWY	7200	8	6	5400	TWY	PCC	1980
16	Sierra TWY	7200	8	6	5400	TWY	PCC	1980
17	South Apron old	101250	72	24	33750	Apron	PCC	1980
18	South Apron New	40000	64	23	14375	Apron	PCC	2012
19	North Apron old	101250	72	24	33750	Apron	PCC	1980
20	North Apron New	39375	63	23	14375	Apron	PCC	2012
21	Maintenance apron	59062.5	42	19	26718.75	Apron	PCC	1980
22	Cargo Apron	39600	44	20	18000	Apron	PCC	1980
23	Hotel Apron	43750	70	13	8125	Apron	AC	2006

Where:

APC: Asphalt over Portland cement concrete

RWY: Runway

TWY: Taxiway

The percentage of each type of airfield pavement shown in Figure 3.11, is 31% for APC, 35 % for AC and 34% for PCC. These percentage calculated based on the total area of each type which will be used in expert system Paver.

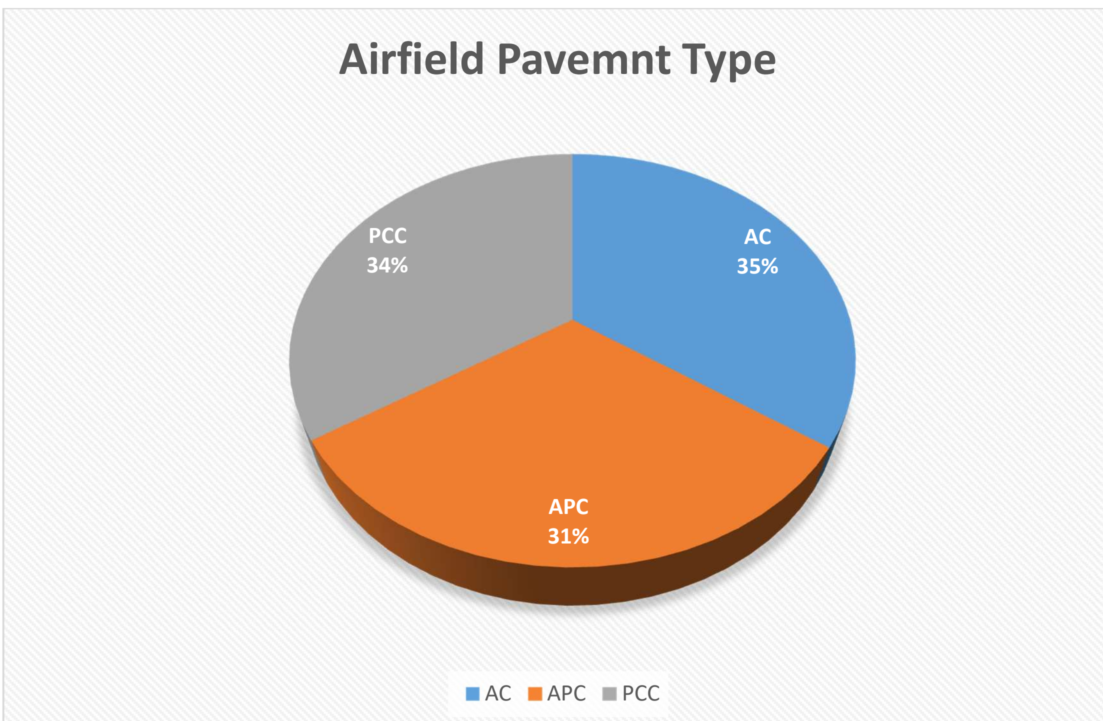

Figure 3.11 Airfield Pavement Type Percentage

The second step and process on the inventory set of data as initial data. The process start as explained above for section naming, section dividing, surface distress, quantity and severity for each type of distress.

The total traffic in the airport include all departure and arrival flight which landed on the runway it was 74,200 flight divided 37,100 arrival and 37,100 departure with different type of aircraft start form private jet till airbus 380 , boing 777 ,787 ,747 also the cargo aircraft antonov 124 .

3.4.5 Pavement Condition Survey

The first step in the survey and as mentioned above dividing of the pavement section into sample size as per standard size range according to ASTM standard for the airport pavement condition index survey test method D -5340. The standard size for PCC it 20 contiguous slabs ± 8 slabs if the total number of slabs in the section is not evenly divided by 20 or for any specific filed condition, and for AC and porous friction surface 5000 square ft ± 2000 ft (450±180 m^2).

The procedure of distress collection in the site for both flexible pavement and rigid pavement as per the ASTM standard. The equipment which used in the surface distress collection was hand odometer which is required to measure lengths and it read to the nearest 30 mm, straight edge with length around 3 meter, ruler to be used in measurement, airport layout (layout plan) and data sheets to record at minimum the following information: date, location, branch, section, sample unit size, distress types, severity level, quantity and name of surveyor.

The distress inspection was collected for 334 sample of runway, taxiways and apron started after branch definition and section dividing to standard size. The random sample section inspection was conducted by walking over the sample unit measuring the quantity of each type of distress and the severity level for each distress type. Then recording the data as shown in following Figures 3.12 for AC distress and Figure 3.13 for PCC distress. Those Figures are the typical input data of site condition survey.

Appendix B show all the input data of condition survey.

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET					
PID		Inspector Name			
From	Runway 0+000	Branch Use	S RWY	Date Inspected	18.04.2017
To	Runway 3+660	Section Width	60	Section Length	3660

AC Surfaced Distress Codes			
41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weathe
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number	7	Sample Area	600
Distress Code	**L**	**M**	**H**
47	**25**	**25**	
48	**30**	**24**	
41	**6**		
48	**24**		
51	**30**		

Sketch / comment

Sample Number	30	Sample Area	600
Distress Code	**L**	**M**	**H**
48	**90**	**30**	
52	**30**	**30**	
43	**40**		
41	**60**		

Sample Number	53	Sample Area	600
Distress Code	**L**	**M**	**H**
47	**70**		
48	**30**	**30**	**15**
50	**90**		
52	**80**	**60**	

Figure 3.12 Typical Sample of Input Data Inspection for AC of Runway

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET							
PID				Inspector Name			
From	0+000 FOX TWY			Branch Use	F TWY	Date Inspecte	29.07.2017
To	0+810 FOX TWY			Section Width	30	Section Length	990
Slab Width	7.5 m	Slab Length	7.5 m	Number of Slab		16	

PPC Surfaced Distress Codes			
61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faultir	75. Spalling, Corner
64. Durability Crackii	68.Popouts	72.Shattered Slab	76. ASR

Sample Number	19	Sample Area	900
Distress Code	L	M	H
62	1	2	
63		3	5
65		4	2
67		1	2
71		2	1
72			3

Sketch / comment

Sample Number	21	Sample Area	900
Distress Code	L	M	H
62			2
63		2	1
65		4	3
66	2		
71		3	1
72			1

Sample Number	23	Sample Area	900
Distress Code	L	M	H
62		1	2
63		2	
65		3	1
66		2	
71	1	2	

Figure 3.13 Typical Sample of Input Data Inspection for PCC of Taxiway

3.5 Data analysis

3.5.1 Current Airfield Pavement Condition

After the first of data have been completed and the distress for each sample in the section have been collected. The data entered to the paver to calculate the current PCI for each sample unit surveyed and determines an overall PCI for airlifted pavement section. The paver use the last construction data and the pervious data to calculate the deduct value also based on distresses mechanism (load, climate, other) for a pavement section. Table 3.4 shows the current PCI for each section and the rating scale as per Figure 3.6 in the previous section 3.3.

Table 3.4 Current PCI for Airfield Pavement

Number	Branch Name	Section Name	Section PCI value	PCI Rating Scale
1	Runway	South RWY	59	Fair
2	Runway	North RWY	100	Good
3	Taxiway	Alpha TWY	**57**	**Fair**
4	Taxiway	Bravo TWY	71	Satisfactory
5	Taxiway	Charli TWY	59	Fair
6	Taxiway	Delta TWY	55	Poor
7	Taxiway	Eco TWY	Less than 10	Failed
8	Taxiway	Foxtrot TWY	13	Serious
9	Taxiway	Golf TWY	Less than 10	Failed
10	Taxiway	Juliet TWY	92	Good
11	Taxiway	Hotel TWY	88	Good
12	Taxiway	Mike TWY	80	Satisfactory
13	Taxiway	Kilo TWY	79	Satisfactory
14	Taxiway	Lima TWY	85	Satisfactory
15	Taxiway	November TWY	69	Fair
16	Taxiway	Sierra TWY	Less than 10	Failed
17	Apron	South Apron old	29	Very Poor
18	Apron	South Apron New	89	Good
19	Apron	North Apron old	27	Very Poor
20	Apron	North Apron New	90	Good
21	Apron	Maintenance apron	60	Fair
22	Apron	Cargo Apron	18	Serious
23	Apron	Hotel Apron	58	Fair

Table 3.5 shows the casual factor of each section in the airfield as the following: 53% of the distress observed on the airfield pavement is caused by loading condition, the climate (environmental) is caused 35% and the remaining 12% caused by other reason such as (bleeding , oil spillage, corrugation , joint spalling and corner spalling) .

Table 3.5 Casual Factor for Airfield Pavement

Number	Section Name	Distress form Load (%)	Distress form Climate (%)	Distress Form Other Reason (%)
1	South RWY	47	50	3
2	North RWY	0	0	0
3	Alpha TWY	61	37	2
4	Bravo TWY	52	48	0
5	Charli TWY	69	31	0
6	Delta TWY	68	31	1
7	Eco TWY	53	15	32
8	Foxtrot TWY	41	42	17
9	Golf TWY	57	13	30
10	Juliet TWY	0	81	19
11	Hotel TWY	0	95	5
12	Mike TWY	36	64	0
13	Kilo TWY	33	65	2
14	Lima TWY	31	66	3
15	November TWY	92	5	3
16	Sierra TWY	56	5	39
17	South Apron old	71	6	23
18	South Apron New	85	10	5
19	North Apron old	71	6	23
20	North Apron New	82	12	6
21	Maintenance apron	78	12	10
22	Cargo Apron	59	12	29
23	Hotel Apron	28	52	20
	Average	53	12	35

The typical calculation of the PCI for any sample unit in the section described in ASTM - D5340. The calculation for the sample number 57 in hotel taxiway where the PCI for that section 92 as shown in the Figure 3.14.

Appendix C shows the output of PCI for each section.

Example calculation procedure for sample number 57 in hotel taxiway from Table 3.4 explained in steps as follows:

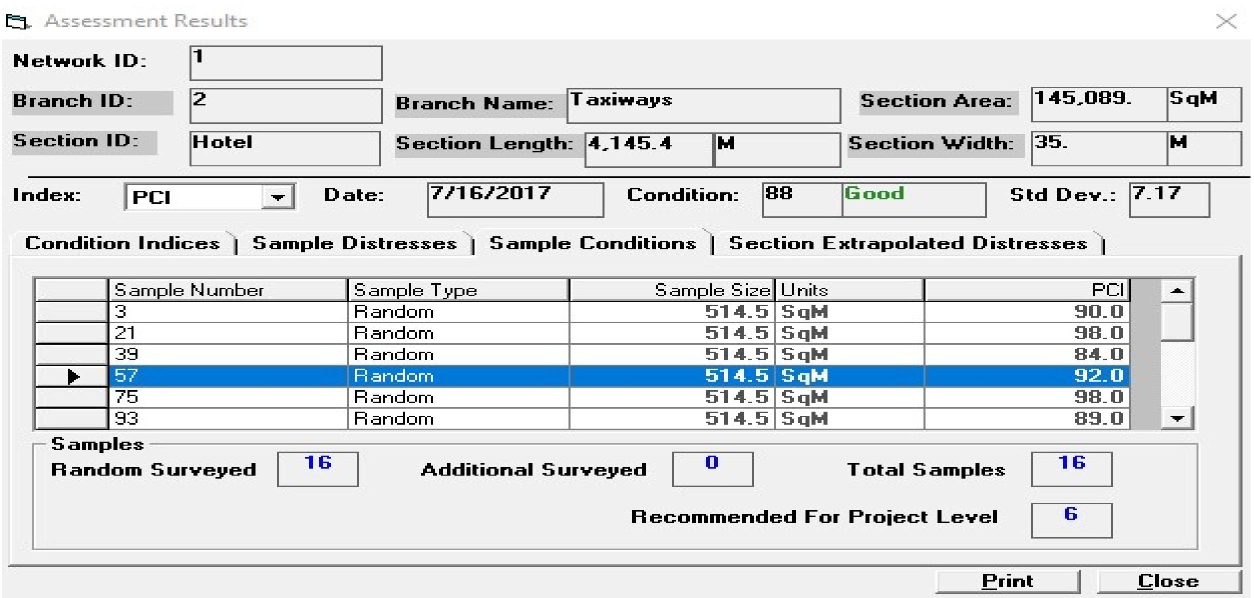

Figure 3.14 Sample Number 57 in Hotel Taxiway Output Data

1) Inspection to pavement surface to determine the type, quantity and severity level of pavement distress, for Sample number 57 the distress was found 10 meter low, 10 meter Medium of Longitudinal and transvers cracks and 10 low of weathering as shown in appendix B.
2) Determine the percent density of each type of distresses by dividing the total distress by total area of sample size multiply by 100. Sample size area 514.5 $m^{2.}$ Therefore density found to be 1.94 %.

3) Determine deduct value for each type form Figure 3.15 and found to be 5, 10, and 5.

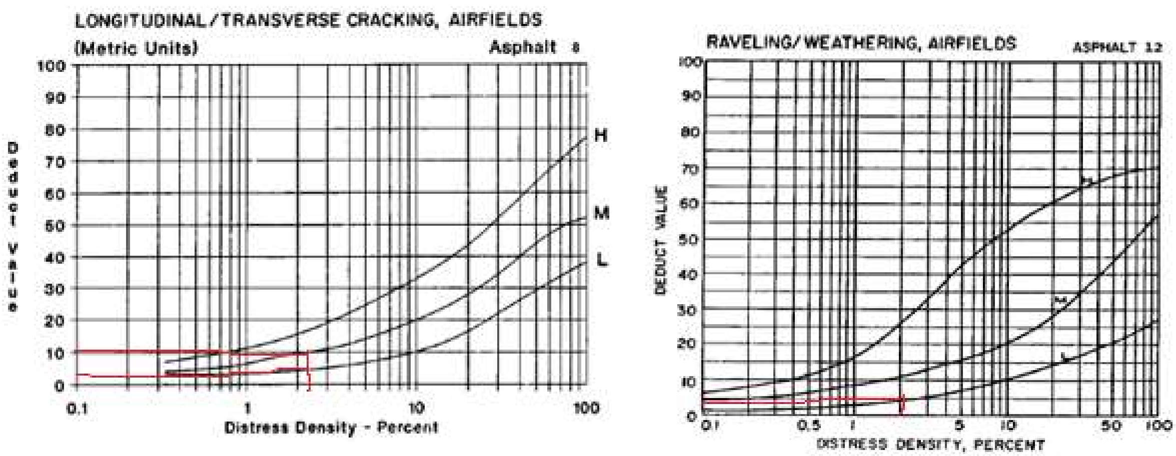

Figure 3.15 Distress Density – Percent (ASTM – D 5340)

4) Compute total deduct value (TDV), the summation of deductive value is found to be 20.

5) Adjust TDV by calculating the corrected deduct value from Figure 3.16 is found to be 8.

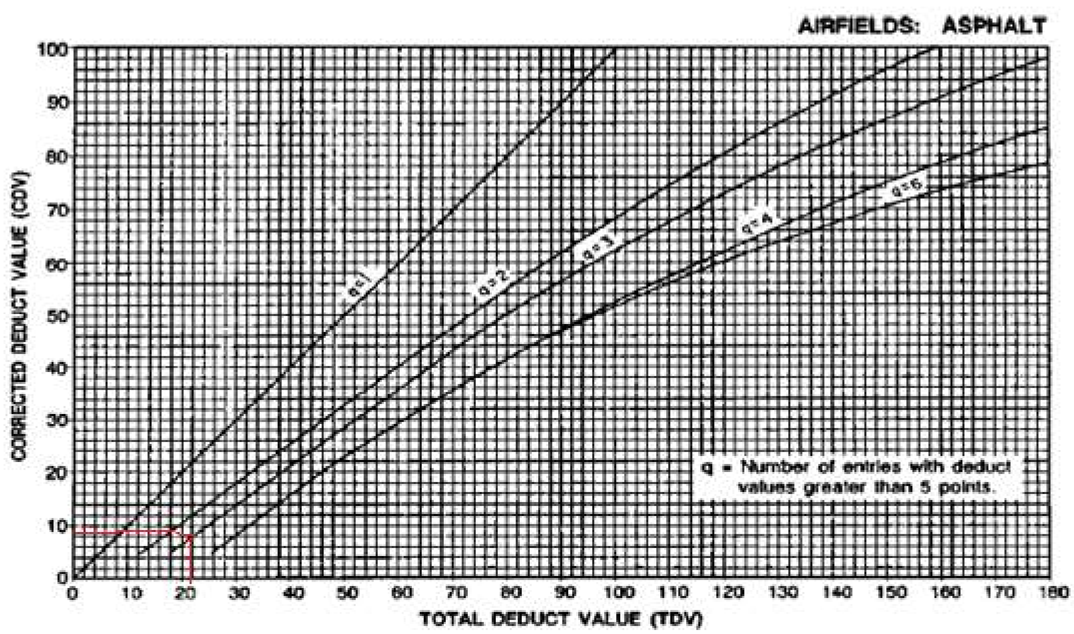

Figure 3.16 Corrected Deducted Value for Flexible Pavement (ASTM – D 5340)

6) Compute PCI by subtracting step 5 from 100. Therefore the PCI is found to be 100-8 = 92.

The Figure 3.17 shows the relation between conditions at last inspection and the section which have been extracted from the paver and as first analysis for these data based on pavement area as shown in Figure 3.18 the 75% of pavement in fair condition and above.

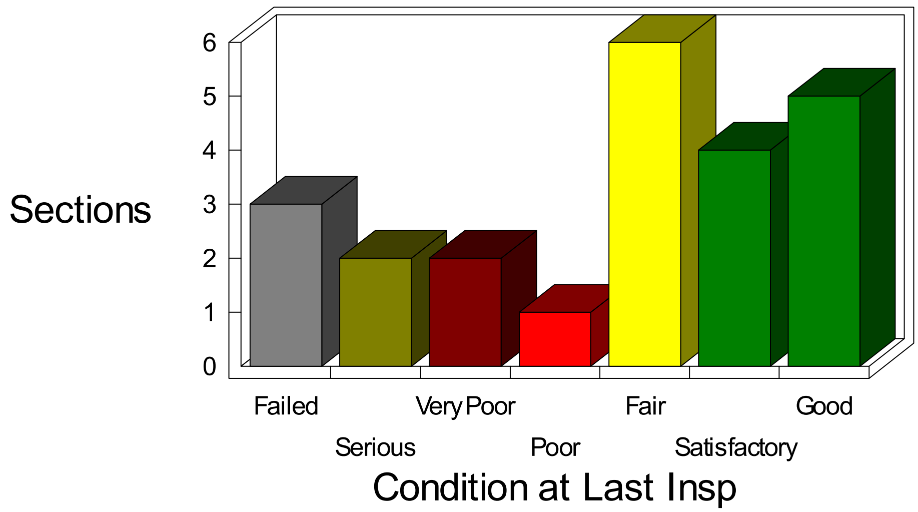

Figure 3.17 PCI Condition at Last Inspection vs Section

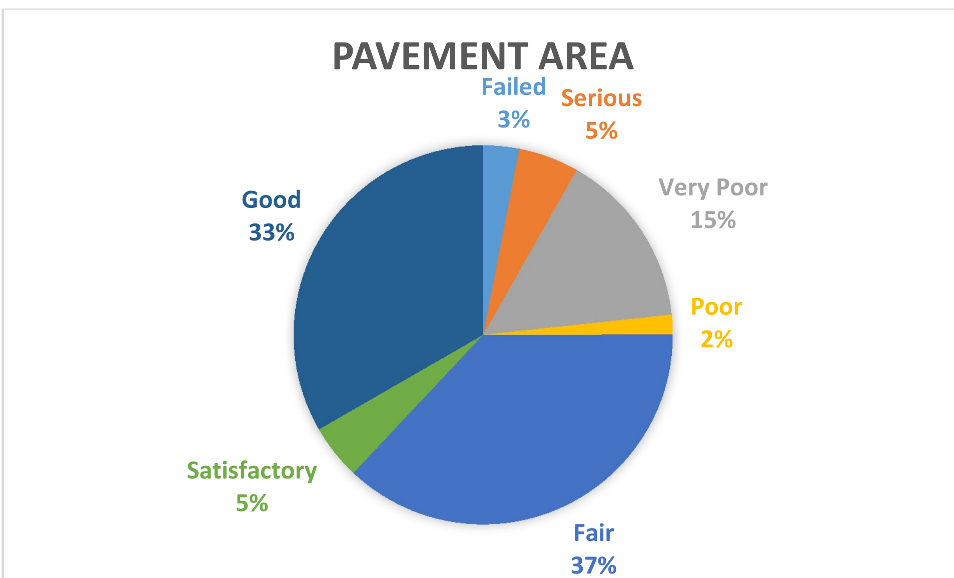

Figure 3.18 Average PCI Condition Based on Area

The Figure 3.19 shows the average PCI based on section number and most of these section in the fair condition and above around 65% of these section

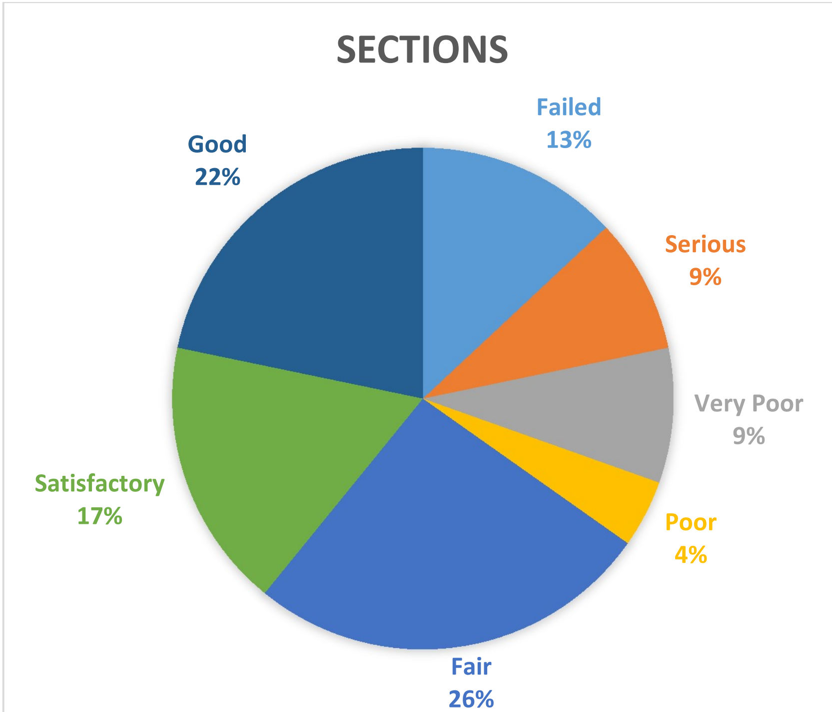

Figure 3.19 Average PCI Condition Based on Section

3.5.2 Prediction of Pavement Condition

One of the micro paver ability prediction of PCI in the coming years and these has been done after calculating the current PCI for each branch and section as shown in the Figure 3.20. The Figure shows the reduction in PCI for the whole airport from 55.61 to 45.74.

Appendix D shows the prediction for each branch and each section. The PCI decrease as the following: For the runway branch the PCI decrease from 79 to 66.5. For the taxiway branch the PCI decrease from 53.57 to 43.36 and. For the apron branch the PCI decrease from 53 to 44.57.

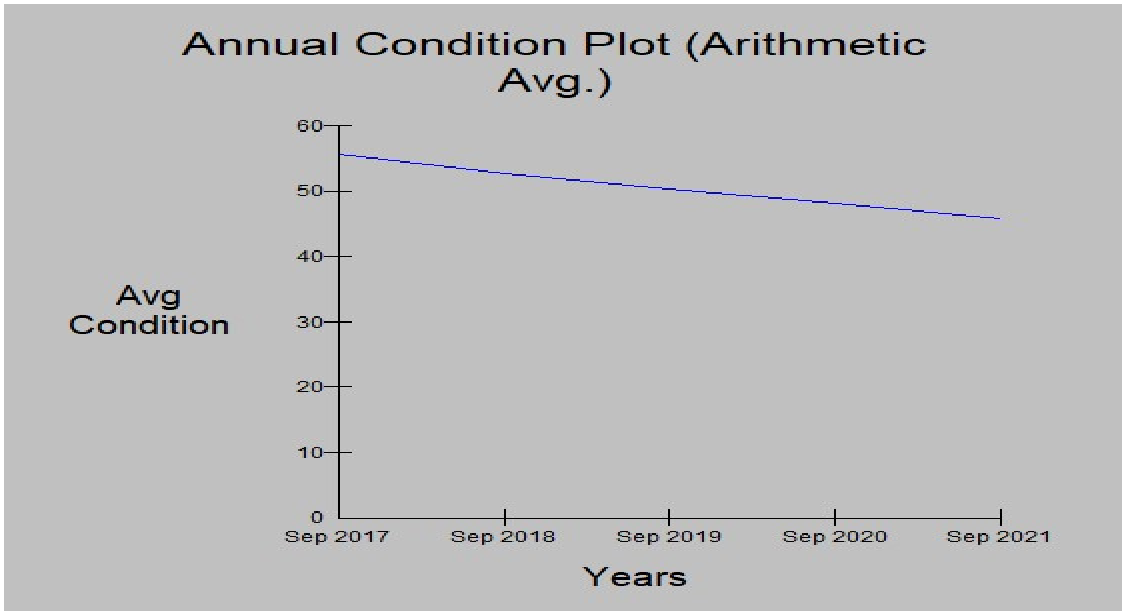

Figure 3.20 Average PCI Condition Prediction for Airport

The Table 3.6 shows the detail of PCI prediction which is show the first year condition the PCI was 100 and with time the PCI decrease to 88 including the area of this section. Table 3.3 shows north RWY data, and the other data for each section shown in Appendix D.

Table 3.6 North RWY Prediction Data

Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
1	2	8/24/2017	Inspection	100	1	Good	219,600.00
1	2	9/1/2017	Prediction	100	1	Good	219,600.00
1	2	9/1/2018	Prediction	97	2	Good	219,600.00
1	2	9/1/2019	Prediction	94	3	Good	219,600.00
1	2	9/1/2020	Prediction	91	4	Good	219,600.00
1	2	9/1/2021	Prediction	88	5	Good	219,600.00

The prediction of the section based on the calculation of the paver which shows the condition of each section in relation to the age of each section. Based on the following equation 3.3.

$y=100-5.8079X+0.32456X^2-0.00605X^3$ …..……………………………..……… Equation 3.3

Where is X: age in years

y: the predicted value of PCI.

With coefficient of correlation is found to be 0.887 and R^2 is found to be 0.788.

An example of applying prediction models for year 2018 for the north RWY is calculated as follows: y = 100- 11.61+1.29-0.048 = 89 if we add the adjustment factor which equal 4X the result is found to be 89+8 = 97.

Table 3.7 PCI Prediction Data of Airfield

Number	Section	PCI predicted after 5 years	PCI Actual
1	South RWY	45	59
2	North RWY	88	100
3	Alpha	33	57
4	Bravo	54	71
5	Charli	35	59
6	Delta	28	54
7	Hotel	76	88
8	Mike	73	79
9	Kilo	72	78
10	Lima	77	85
11	Juliet	89	93
12	Eco	0	2
13	Foxtrot	4	12
14	Golf	0	3
15	November	66	68
16	Seira	0	1
17	Hotel Apron	43	58
18	Cargo	42	17
19	Maintenance	56	59
20	Old North	19	27
21	Old South	21	28
22	New North	83	89
23	New South	81	88

Table 3.7 and Figure 3.21 shows the relation between predicted PCI after five years for all sections and the actual PCI which calculated based on equation 3.3 and the current condition of airfield sections.

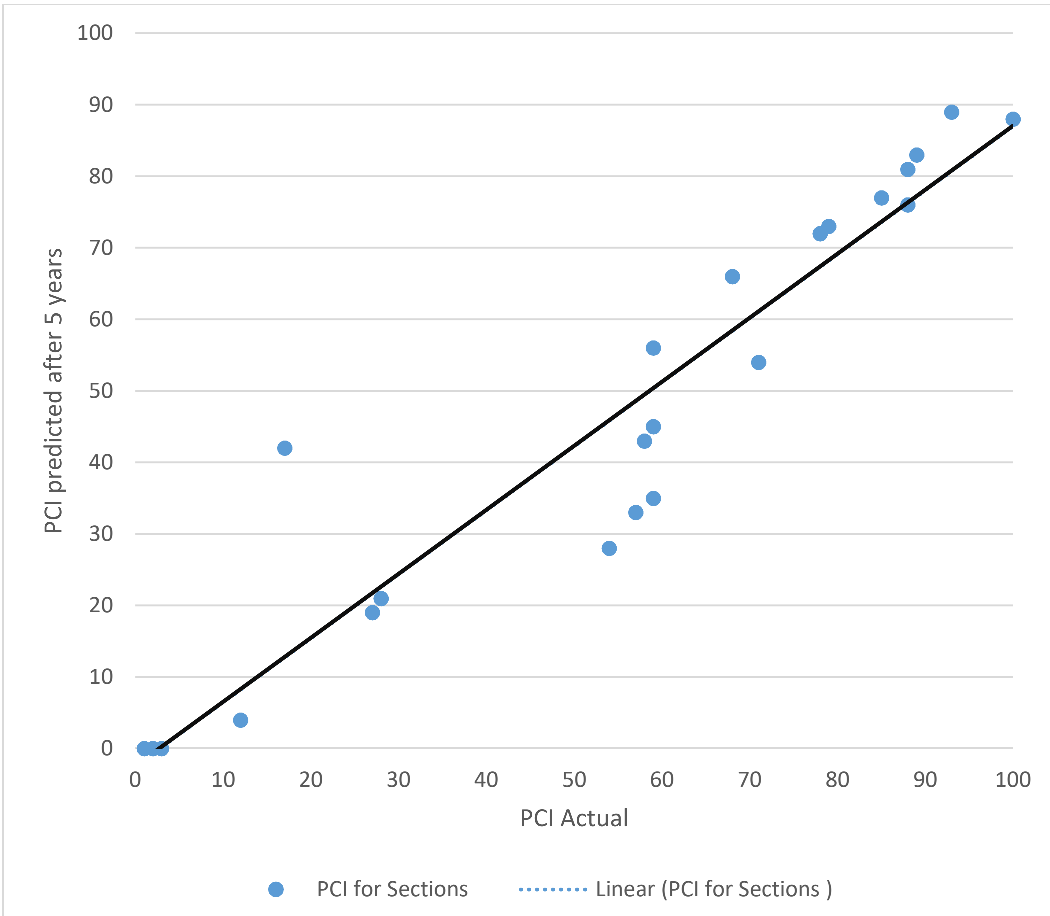

Figure 3.21 PCI Actual Condition Vs PCI Prediction

Figure 3.21 shows the relation of PCI prediction and the actual which shows the relation of the section and the best line between points was found almost at 45 degree as shown.

3.6 Maintenance Plan (criteria)

The maintenance plan and long term work plan shall be prepared once the inventory data and all distress data have been completed and entered to the paver. The software allow the user to enter the possible maintenance activities for each type of local and major maintenance with related cost for each activity. After that the paver can calculate the M&R plan for specific period of time based on available budget usually annual and five year maintenance plan. The methodology and assumption used in developing M&R plan described above in section 3.2 part 3.2.10 develop PCI versus cost models which describe the critical PCI and the relation of PCI with cost and budget definition.

Table 3.8 shows the relation between the PCI and the applicable pavement treatment as per the common airport pavement practice, starting from the minor and monitoring till the reconstruction of airfield pavement section. (Hajek et al 2011)

Table 3.8 PCI for Airport Pavement and Treatment. (Hajek et al 2011)

Number	PCI Rating	Description	Applicable Pavement Treatment
1	86 - 100	Good - only minor distresses	Routine maintenance only
2	71 - 85	Satisfactory-low and medium distresses	Preventative Maintenance
3	56 - 70	Fair, some distresses are severe	Corrective maintenance and rehabilitation
4	41 - 55	Poor—severity of some of the distresses can cause operational problems	Rehabilitation or reconstruction
5	26 - 40	Very poor—severe distresses cause operational problems.	Rehabilitation or reconstruction
6	11 - 25	Serious—many severe distresses cause operational restrictions	Immediate repairs and reconstruction
7	0 - 10	Failed—pavement deterioration prevents safe aircraft operations	Reconstruction

The critical PCI plays as a main role in the budget and maintenance as mentioned in section 3.2 since the work for some runways and taxiways or apron depend on the PCI value if it below or above the critical PCI. Table 3.9 shows the critical PCI for airfield pavement as per the common practice of airport pavement maintenance.

Table 3.9 Critical PCI for Airport Pavement. (Hajek et al 2011)

Number	Facility Type	Level of Service Average PCI for all Section		Minimum Acceptable Level Of Service PCI for individual Section
		Target or desirable	Minimum acceptable	
1	Runway	80	65	55
2	Taxiway	70	60	45
3	Apron	70	60	40

The Prioritization of the maintenance of airfield section based on the available budget since the budget limited and it divided into two section. The first one for the preventive, routine, and urgent maintenance. The second section based on the business plan which shown in Table 3.9 that include any rehabilitation and reconstruction of airfield pavement section.

The first budget pavement section for routine and urgent maintenance around 500,000 JOD/year including the rubber removal and the marking work, and for the business plan shown in Table 3.10 for the coming five years. For M&R policies it depend on the critical PCI the first one was called the stopgap (safety) for these section below the critical PCI and the second one was called the preventive for the section above the critical PCI and the defect can be fixed using the localized maintenance activity.

Table 3.10 Total Budget for Five Years

Number	Year	Routine Budget yearly	Major Budget	Total Budget
1	2018	500,000 JOD	1,250,000 JOD	1,750,000 JOD
2	2019	500,000 JOD	6,250,000 JOD	6,750,000 JOD
3	2020	500,000 JOD	3,000,000 JOD	3,500,000 JOD
4	2021	500,000 JOD	2,500,000 JOD	3,000,000 JOD
5	2022	500,000 JOD	1,250,000 JOD	1,750,000 JOD

Table 3.10 shows the total budget for the coming five years as per airport operator, the budget is divided into two section but in the calculation total budget will used as the funded form airport operator for routine and major work these budget exclude any new construction for new runway, taxiway or apron, above mentioned budget for the current situation and M&R for the existing airfield.

Table 3.11 shows the preventive M&R policy for AC distress which shows each type of distress with the severity and maintenance treatment. For example when the inspected distress is alligator cracking with high severity then deep AC patching is applied.

The Table 3.12 shows the preventive M&R policy for PCC distress which shows each type of distress with the severity and maintenance treatment. For example when the inspected distress is corner break with high severity then PCC patching – Full depth is applied.

Table 3.11 Preventive M&R Policy for AC Distress (Shahin and Walther, 1990)

Distress type	Distress severity	Maintenance treatment
Alligator cracking	Low	Crack Sealing - AC
	Medium	Patching - AC Deep
	High	Patching - AC Deep
Bleeding	N/A	Monitor
Block cracking	Low	Monitor
	Medium	Crack Sealing - AC
	High	Crack Sealing - AC
Corrugation	Low	Monitor
	Medium	Patching - AC Deep
	High	Patching - AC Deep
Depression	Low	Monitor
	Medium	Patching - AC Shallow
	High	Patching - AC Deep
Jet blast	N/A	Patching - AC Shallow
Joint reflection cracking	Low	Monitor
	Medium	Crack Sealing - AC
	High	Crack Sealing - AC
Longitudinal & transverse cracking	Low	Monitor
	Medium	Crack Sealing - AC
	High	Crack Sealing - AC
Oil spillage	N/A	Patching - AC Shallow
Patching	Low	Monitor
	Medium	Crack Sealing - AC
	High	Patching - AC Deep
Polished aggregate	N/A	Monitor
Raveling / Weathering	Low	Monitor
	Medium	Surface Treatment
	High	Patching - AC Shallow
Rutting	Low	Monitor
	Medium	Patching - AC Deep
	High	Patching - AC Deep
Shoving	Low	Monitor
	Medium	Patching - AC Shallow
	High	Patching - AC Deep
Slippage cracking	N/A	Patching - AC Shallow
Swelling	Low	Monitor
	Medium	Patching - AC Deep
	High	Patching - AC Deep

Table 3.12 Preventive M&R Policy for PCC Distress. (Shahin and Walther, 1990)

Distress type	Distress severity	Maintenance treatment
Blow up	Low	Patching - PCC Partial Depth
	Medium	Slab Replacement - PCC
	High	Slab Replacement - PCC
Corner break	Low	Monitor
	Medium	Patching - PCC Full Depth
	High	Patching - PCC Full Depth
Linear cracking	Low	Monitor
	Medium	Crack Sealing - PCC
	High	Patching - PCC Full Depth
Durability cracking	Low	Monitor
	Medium	Patching - PCC Full Depth
	High	Slab Replacement - PCC
Joint seal damage	Low	Monitor
	Medium	Joint Seal (Localized)
	High	Joint Seal (Localized)
Small patch	Low	Monitor
	Medium	Patching - PCC Partial Depth
	High	Patching - PCC Partial Depth
Large patch	Low	Monitor
	Medium	Patching - PCC Full Depth
	High	Patching - PCC Full Depth
Popouts	N/A	Monitor
Pumping	N/A	Monitor
Scaling	Low	Monitor
	Medium	Patching - PCC Partial Depth
	High	Slab Replacement - PCC
Faulting	Low	Monitor
	Medium	Grinding (Localized)
	High	Grinding (Localized)
Shattered slab	Low	Monitor
	Medium	Crack Sealing - PCC
	High	Slab Replacement - PCC
Shrinkage cracking	N/A	Monitor
Joint spall	Low	Monitor
	Medium	Patching - PCC Partial Depth
	High	Patching - PCC Partial Depth
Corner spall	Low	Monitor
	Medium	Patching - PCC Partial Depth
	High	Patching - PCC Partial Depth

3.7 Development and implantation of MMS

The last two steps in the MMS and the most important steps are include the first one which related to the M&R plan and budget prioritizing according to the section situation and importance such as the runway consider more important than taxiway and apron, including the generation of report , analysis of the result report and the following :

1. The M&R plan for one year (annual).
2. The M&R plan for five year.
3. Inventory report that will view all pavement inventory data.
4. Work report that view history report of pavement.
5. Pavement condition Report that view and display the PCI for all section.
6. The condition analysis report that shows the prediction of future pavement performance.
7. M&R reports for the annual and five year which related to the above point 1&2.

All of the above steps will be discussed in more detail in chapter 4

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Chapter Four

Implementation of the Maintenance Management System for the Airfield

4.1 Introduction

This chapter include the implementation of M&R policy plan and budget prioritizing according to the section importance also it include the implementation of MMS. The MMS include: Data inventory, Analysis, Maintenance & Repair Plan, and Implementation, taking into consideration the benefit of MMS according to (Shahin, 2005) as follows:

- Provide necessary data to legislators and managers for budget determination.
- Maximize the return on investment from available M&R budget.
- Create a prioritized 5-year plan.
- Establish minimum condition requirements.
- Identify areas in need of maintenance.
- Justify M&R projects.

Figure 4.1 shows the process chart of the MMS system implementation as main four steps and under main steps will be sub steps, all these steps was described earlier in the previous chapter in article 3.2 research methodology and 3.5 data analysis.

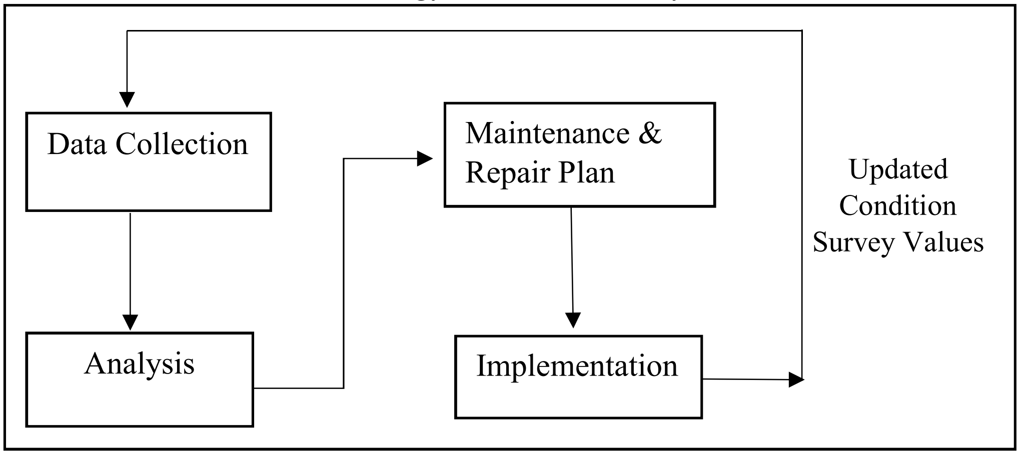


Figure 4.1 MMS Component Methodaolgy

4.2 Maintenance and Repair Plan

The M&R include the both annual and five year plan for the airfield pavement. Table 4.1 shows the cost of each activity that used to be as the localized maintenance. These cost was calculated based on the average price of international airport for three years according to the activity description and the treatment that will be applied for the airfield pavement.

The PCI value provides indication level of rehabilitation that will be needed to repair a given pavement in general maintenance activities such as crack sealing and patching which are often provide benefit when the PCI more than 60 , and as the pavement continues to deteriorate, more complex and expensive treatments will be necessary. Pavements with a PCI between 40 and 60 are good candidates for a variety of major repairs ranging from overlays to reconstruction. Once the PCI drops below 40, reconstruction is typically the only viable alternative as mentioned in chapter 3 article 3.6.

Table 4.1 M&R Activity With Cost *

Number	Discerption	Unit of Measure	Cost (JOD)
1	Crack Sealing - AC	m	2.0
2	Crack Sealing - PCC	m	3.0
3	Grinding (Localized)	m	40.0
4	Joint Sealant (Localized)	m	1.5
5	Patching - AC Deep	m^2	40.0
6	Patching - AC Shallow	m^2	20.0
7	Patching - PCC Full Depth	m^2	142.0
8	Slab Replacement - PCC	m^2	142.0

* According to Jordanian cost and Price in the airports

4.2.1 Annual M&R

The annual M&R plan includes the type of policy that applied and the description of work according to the safety and preventive policy. The work quantity and the cost of the wok that will be performed to the each section for the three branch is shown in Table 4.2.

Table 4.2 Annual M&R Plan With Cost

Policy	Work Type	Quantity	Cost (JOD)
LOCALIZED SAFETY FOR AIRFIELDS	Crack Sealing - AC	2337.5 m	4,675.48
LOCALIZED SAFETY FOR AIRFIELDS	Crack Sealing - PCC	6306.77 m	18,920.31
LOCALIZED SAFETY FOR AIRFIELDS	Grinding (Localized)	803.94 m^2	32,157.64
LOCALIZED SAFETY FOR AIRFIELDS	Patching - AC Deep	290.33 m^2	11,613.19
LOCALIZED SAFETY FOR AIRFIELDS	Patching - PCC Full Depth	3854.74 m^2	547,372.04
LOCALIZED SAFETY FOR AIRFIELDS	Slab Replacement - PCC	26318.05 m^2	3,711,602.80
LOCALIZED PREVENTIVE FOR AIRFIELDS	Crack Sealing - AC	767.98 m	1,535.98
LOCALIZED PREVENTIVE FOR AIRFIELDS	Crack Sealing - PCC	372.4 m	1,117.18
LOCALIZED PREVENTIVE FOR AIRFIELDS	Patching - AC Deep	3.18 m^2	127.19
LOCALIZED PREVENTIVE FOR AIRFIELDS	Patching - PCC Full Depth	182 m^2	25,843.99

The work cost is found for all sections in the each branch by multiplying work quantity by unit cost of that work, for example patching for AC Deep is a type of work in safety policy applied based on the inspected distresses and the severity of the distress, the work quantity was found

290.33 m^2 by multiplying this quantity by unit cost, the cost of work was found around 11,613.19 JOD. Also for the crack sealing of localized safety 6306.77 m* 3 JOD/m = 18,920.31 JOD.

Table 4.3 shows total cost for each applied policy for the safety and preventative and the number of section for each type, also the average of PCI before and after annual maintenance applied.

Table 4.3 Total Annual M&R Cost for Each Policy

Policy	Number of section	Sum of cost	Average of Start PCI	Average of End PCI
LOCALIZED SAFETY FOR AIRFIELDS	14	4,326,341.46 JOD	36	52
LOCALIZED PREVENTIVE FOR AIRFIELDS	9	28,624.34 JOD	85	87.2

Based on the previous result and Table 4.4 explain the detail annual M&R cost for each section in the network. Also Table 4.4 shows the start condition, policy applied, end condition and cost for each section in the each branch. For example in the branch 1, section south RWY shows that the start PCI condition is 59. The safety policy applied and the cost is founded to be 10,292.56 JOD after applying the policy the PCI increased to be 61. And the same for the other section in each branch for runway, taxiway and apron.

For south RWY the 10.292.56 obtained from the treatment for longitudinal & transvers cracks, joint reflection cracking and block cracking is crack sealing with total cost 3,568.5 JOD obtained from quantity 1784.27 multiply by cost of crack sealing 2 JOD . Adding to the alligator cracking the treatment patching –AC deep with total cost 6,724.06 obtained from quantity 168.1 multiply by cost of patching –AC deep 40 JOD.

Appendix E shows more detail M&R policy for each distress with related cost and work quantity.

Table 4.4 Detail Annual M&R Cost for Each Section

Branch	Section	Start Condition	Policy	End Condition	Cost (JOD)
1	South RWY	59	LOCALIZED SAFETY FOR AIRFIELDS	61	10,292.56
1	North RWY	100	LOCALIZED PREVENTIVE FOR AIRFIELDS	100	0.00
2	Alpha	57	LOCALIZED SAFETY FOR AIRFIELDS	58	3,207.75
2	Bravo	71	LOCALIZED PREVENTIVE FOR AIRFIELDS	73	329.38
2	Charli	59	LOCALIZED SAFETY FOR AIRFIELDS	60	634.60
2	Delta	54	LOCALIZED SAFETY FOR AIRFIELDS	55	660.12
2	Hotel	88	LOCALIZED PREVENTIVE FOR AIRFIELDS	88	718.68
2	Mike	79	LOCALIZED PREVENTIVE FOR AIRFIELDS	81	71.05
2	Kilo	78	LOCALIZED PREVENTIVE FOR AIRFIELDS	81	314.98
2	Lima	85	LOCALIZED PREVENTIVE FOR AIRFIELDS	86	221.80
2	Juliet	93	LOCALIZED PREVENTIVE FOR AIRFIELDS	93	7.28
2	Eco	2	LOCALIZED SAFETY FOR AIRFIELDS	32	143,214.00
2	Foxtrot	12	LOCALIZED SAFETY FOR AIRFIELDS	42	578,634.60
2	Golf	3	LOCALIZED SAFETY FOR AIRFIELDS	37	1,135,734.00
2	November	68	LOCALIZED SAFETY FOR AIRFIELDS	76	1,466.00
2	Seira	1	LOCALIZED SAFETY FOR AIRFIELDS	31	227,688.00
3	Hotel Apron	58	LOCALIZED SAFETY FOR AIRFIELDS	60	1,493.64
3	Cargo	17	LOCALIZED SAFETY FOR AIRFIELDS	43	639,922.80
3	Maintenance	59	LOCALIZED SAFETY FOR AIRFIELDS	69	149,386.20
3	Old North	27	LOCALIZED SAFETY FOR AIRFIELDS	53	835,713.10
3	Old South	28	LOCALIZED SAFETY FOR AIRFIELDS	51	599,760.10
3	New North	89	LOCALIZED PREVENTIVE FOR AIRFIELDS	92	12,038.48
3	New South	88	LOCALIZED PREVENTIVE FOR AIRFIELDS	91	13,456.69

4.2.2 Determination of Five Year M&R Plan

The applied policy of five years M&R plan was determined according to article 3.2.10 in chapter three and the result and procedure shown in Figure 3.3 for PCI less than critical PCI as following: checking the fund availability, if the fund available PCI set to be 100 and the major M&R will applied otherwise the stop-gap maintenance applied. Also the procedure shown in Figure 3.4 in chapter three for PCI more than critical PCI as the following: first checking of the distress due to load or not, according to our result 53% of distress due to load then checking for fund availability, if the fund available PCI set to be 100 and the major M&R will applied otherwise the localized preventive maintenance applied.

Figure 4.2 shows the prediction of the PCI if the five years M&R plan applied as shown in Table 4.5 and Table 4.6 .The average of current PCI for the all section in the airport 55 and after the first year PCI will become 77 and with second year the PCI will become 74 and with applied maintenance the PCI will become 82. Then in third year the PCI start with 79 and will become 82, then fourth year of plan will start with 80 and will become 82. The same for the fifth year of the plan.

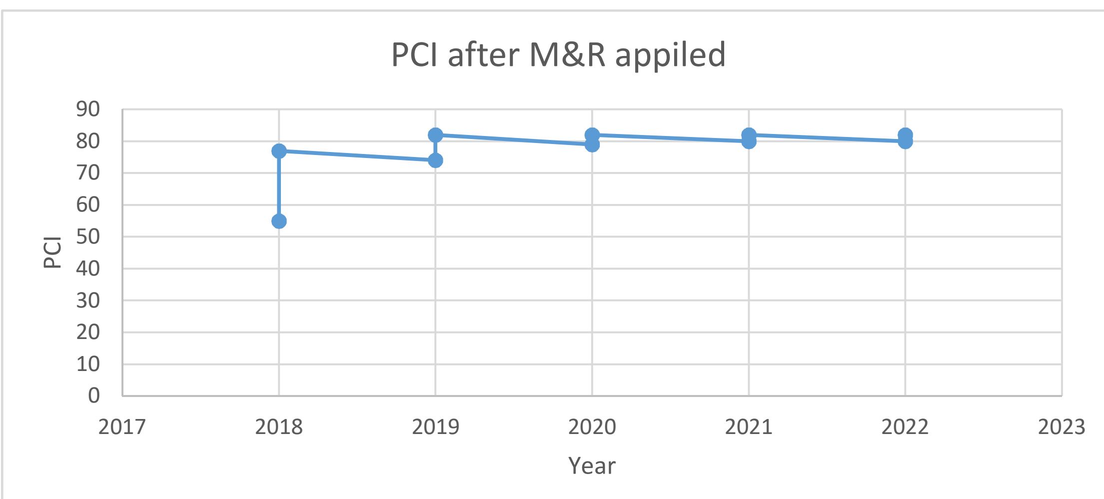


Figure 4.2 PCI Prediction After Five Year M&R Applied

Table 4.5 shows the M&R five year summary plan for all section in the airlifted with stop-gap maintenance, preventive and major maintenance. The available fund shown in Table 3.6 in chapter three. These fund available and funded by airport operator.

Table 4.5 Total Five M&R Plan Cost

Year	Sum of Stop Gap	Sum of Preventive	Sum of Major
2018	3,947,272.97 JOD	28,624.34 JOD	JOD 79,418,084.44
2019	3,041,636.13 JOD	2,682,025.03 JOD	JOD 47,262,605.88
2020	3,266,596.82 JOD	3,733,824.28 JOD	JOD 36,982,400.50
2021	3,482,899.75 JOD	4,442,598.18 JOD	JOD 32,073,283.00
2022	3,741,887.50 JOD	4,705,303.14 JOD	JOD 19,592,274.59

From Table 4.5 the needed budget is huge and not planned and as descried previously for these section below critical PCI the applied maintenance for these section will be stop-gap maintenance as needed budget. Also for these sections above the critical PCI the applied maintenance will be the preventive maintenance in order to keep the current PCI.

Appendix F shows more detail maintenance (stop-gap, preventive and major) for each section and for five year.

Table 4.6 shows the summation of total funded and the summation of total unfunded. Also the average of PCI before applying M&R plan and after applying M&R. The cost of each year calculated based on the cost from Table 4.1 of each treatment multiply by the section area as per the distress. For example the PCI for south runway in 2018 set to be 100 that mean major M&R will applied for this section total area of south runway 219600 m^2 and the prober treatment for this section Patching –AC Deep with cost 40 JOD / m^2 the total required budget for this section 8,810,005 JOD as shown in Appendix F.

Table 4.6 Total Funded and Unfunded Five M&R Plan Cost

Year	Sum of needed budget	Sum of available fund	Sum of Total Unfunded	Average PCI Before	Average PCI After
2018	83,393,981.12 JOD	1,750,000 JOD	81,643,981.12 JOD	55	77
2019	52,986,267.04 JOD	6,750,000 JOD	46,236,267.04 JOD	74	82
2020	43,982,821.60 JOD	3,500,000 JOD	40,482,821.60 JOD	79	82
2021	39,998,780.93 JOD	3,000,000 JOD	36,998,780.93 JOD	80	82
2022	28,039,465.50 JOD	1,750,000 JOD	26,289,465.50 JOD	80	82

The needed budget is found huge money due to PCI of the 25% of sections less than critical PCI and reconstruction needed as per the practice of airport maintenance as shown in the Table 3.4 in the chapter three. The section that have PCI less than 55 need reconstruction.

All section with these rank (poor, very poor, serious and failed) need reconstruction, in our case study 25 % of the airfield airport pavement from total pavement area that have PCI less than 55 and in poor condition rank and below.

The importance of the airport pavement is based on the usage of the pavement. Runway have the number 1 in importance then the high speed exit taxiway , then is the normal taxiway and the last one is the apron.

4.3 Application of Expert system

The expert system for pavement management system is used in the case study analysis. Is combined in two software. The first software is the old version of paver (micro paver 5) and the second one is available online on the FAA website and it called Paveair. Both software have the same capability in the analysis and repot generation.

The first step in both software is the creation of network, then the branch is created for the runway, taxiway and the apron. Each of these branch is divided into sections for both runway (south and north) and for the taxiway. Each taxiway divides based on the traffic and usage of these taxiways start form (Alpha, Bravo, Charli…… etc) , and the last branch was the apron. The apron is divided based on usage and date of construction (commercial include old north, old south, new south, new north and the cargo, maintenance, hotel). Each section of these branches is divided to the sample unit for the data collection of distress. The sample unit which is surveyed based on the equation which is explained previous in chapter 3 and the random selection of these sample based on the ASTM D 5340 procedure.

The following steps are followed to generate and construct MMS for the airport airfield. The step are generated on the Micro paver and the Paveair softwares at the same time. The following will show some of these steps from micro paver and the other from Paverair :

1. Database creation
2. From the inventory tab is selected to create Network, branch, and section as shown in Figure 4.3. It shows the network name and the network ID.
3. The new icon selected for Network creation.

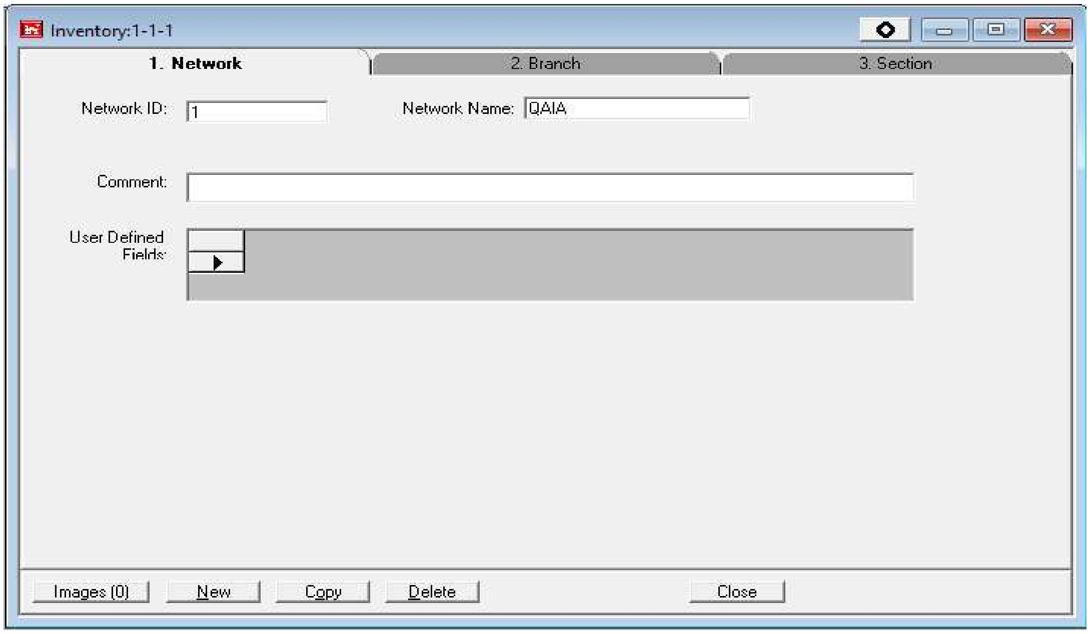


Figure 4.3 Typical Network Creation and Network ID

4. The branch tab selected to create the branch, in this case study three branch was created, the first one Runway (branch number 1), the second Taxiway (branch number 2), and the third one Apron (branch number 3) as shown in Figure 4.4.

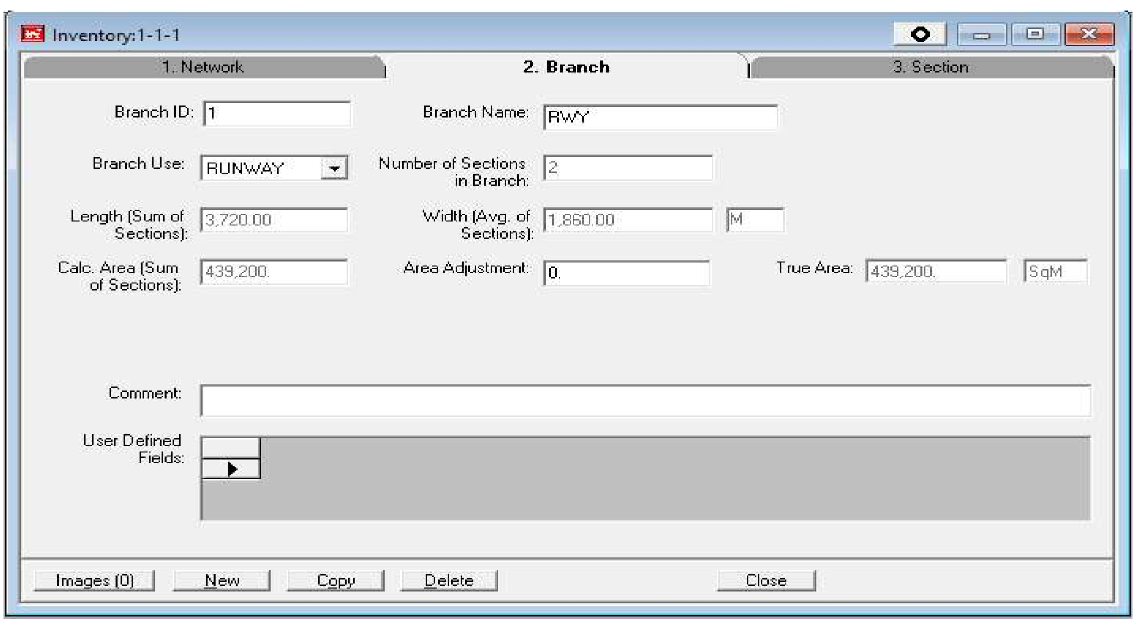


Figure 4.4 Typical Branch Creation and Branch ID

5. The branch tab shall include: the branch ID, Branch name, branch use (runway, taxiway or apron) to be filled and entered.

6. The section tab selected to enter the section of each branch from the above point as shown in Figure 4.5, the section include the section ID (as discussed in article 3.4), from, To, surface type (AC, APC, PCC), Rank, Length, width and the Last construction date all these required once new icon is clicked.

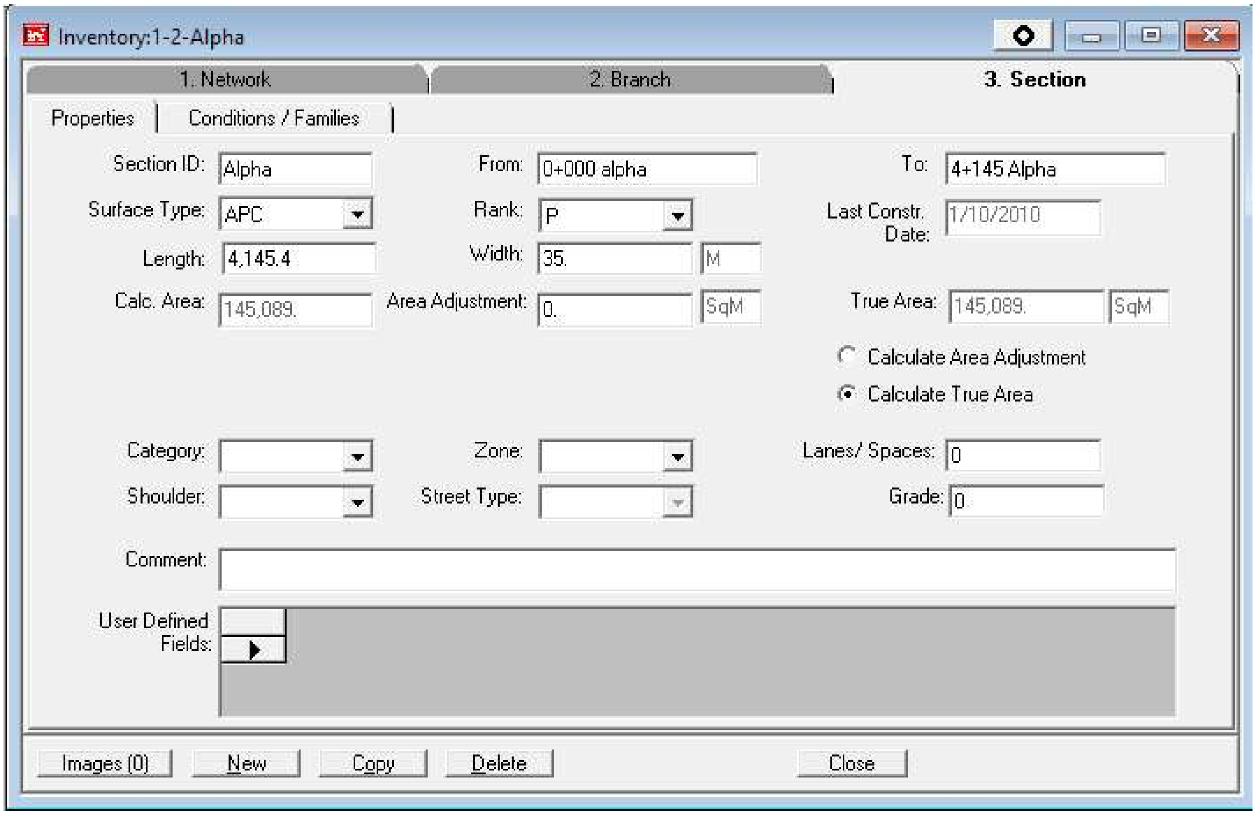


Figure 4.5 Typical Section Creation and Section ID

7. Once the inventory data entered. The second step to click on PCI icon in the command bar and the Figure will appear as shown in Figure 4.6. And once the date of inspection entered after selecting edit inspection as shown Figure 4.7 include the number of total sample and surface type also.

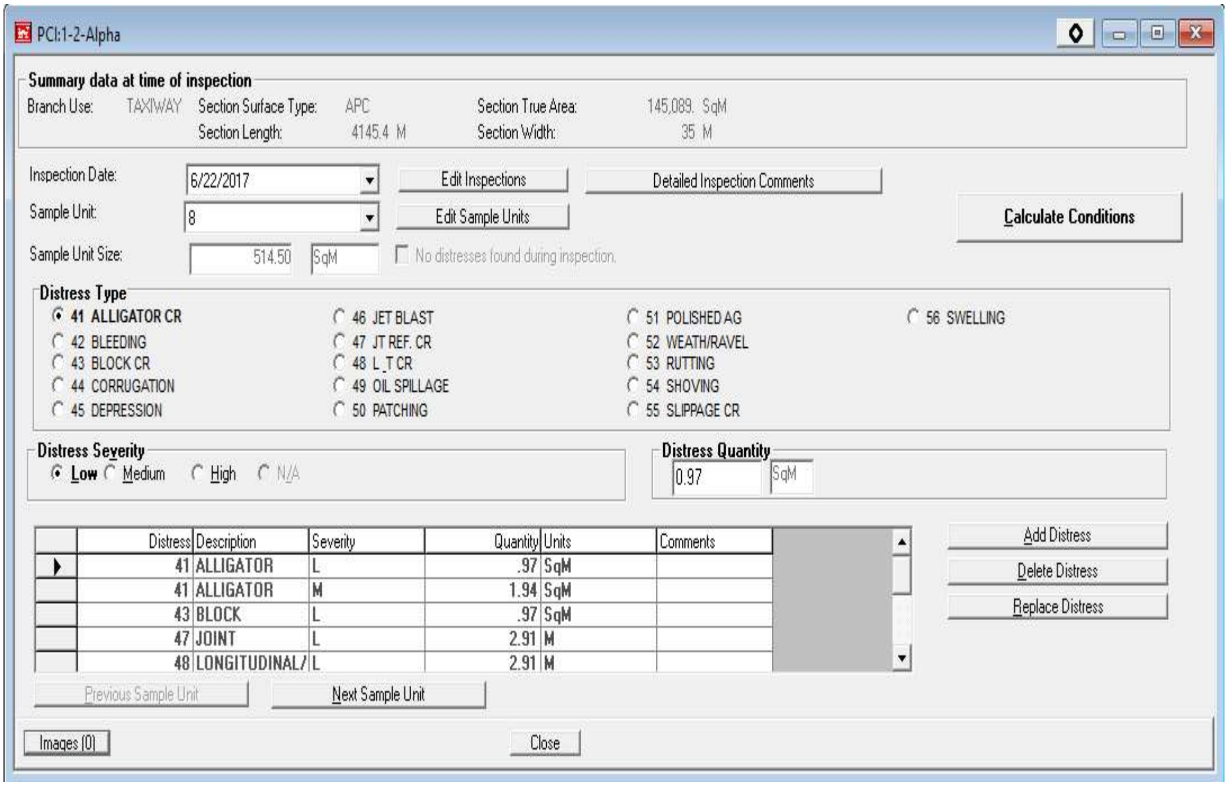


Figure 4.6 Typical Sample Distress Data

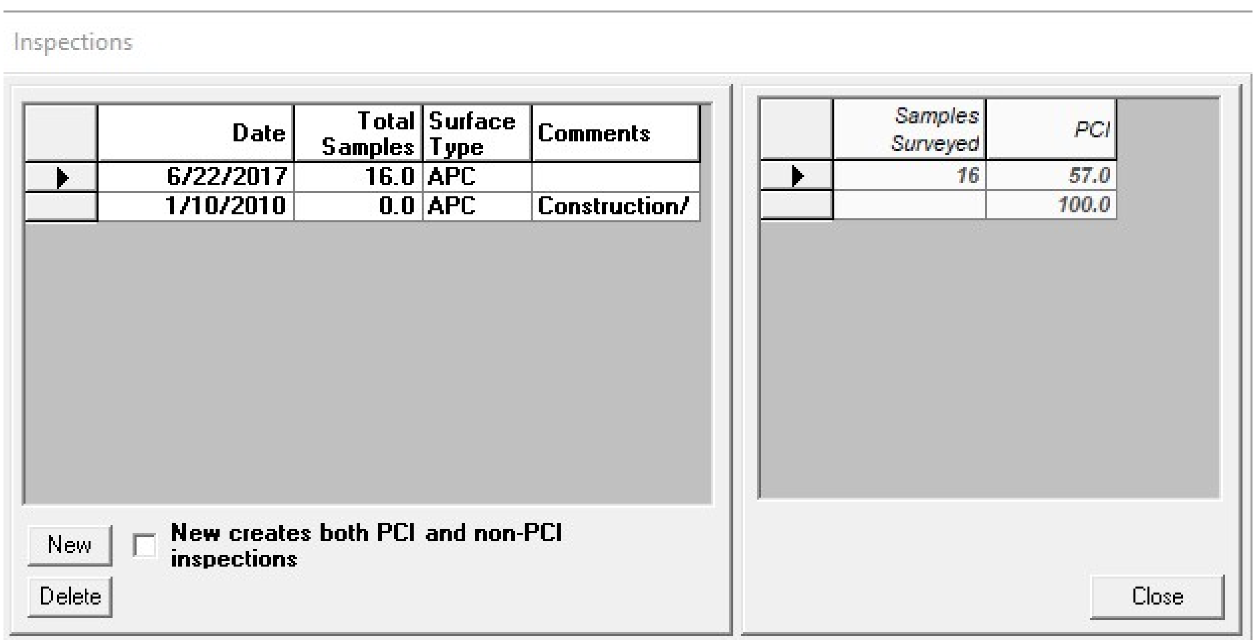


Figure 4.7 Typical Sample Inspection Edit

8. Then edit sample unit icon will be selected to edit the sample number and to add the sample size also sample type as shown in Figure 4.8.

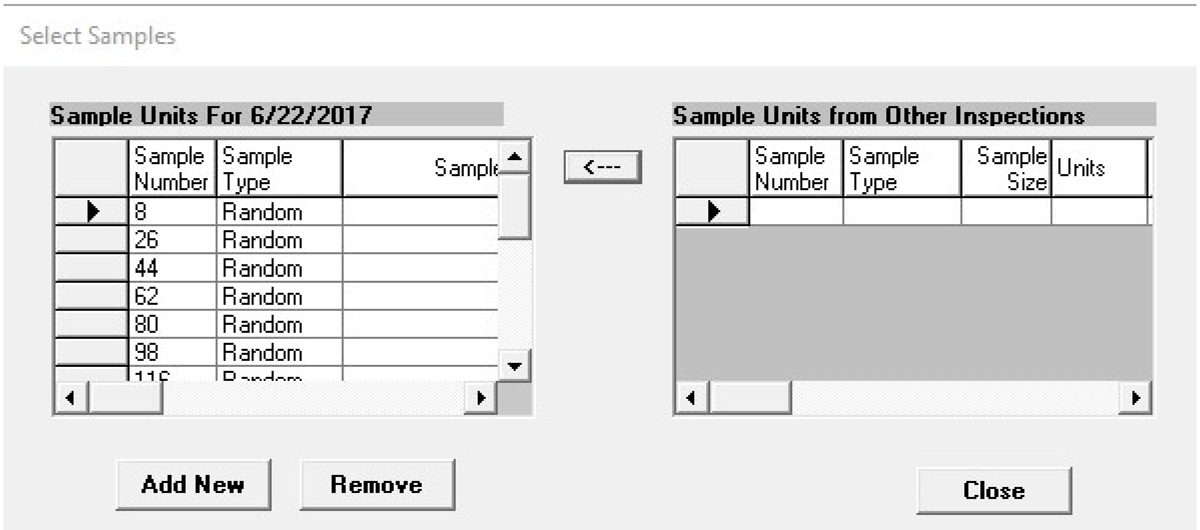


Figure 4.8 Typical Sample Unit Edit

9. Once the above point 7 and 8 completed. Each type of distress (alligator, bleeding … etc) ,quantity and severity (low , medium , high) as shown in Figure 4.6 should be entered.
10. Once all sample distress completed and entered to the system then calculate condition icon selected to calculate the PCI condition for the section form the entered data as shown in the Figure 4.9 .Also shows the PCI value and the rank for the sample.

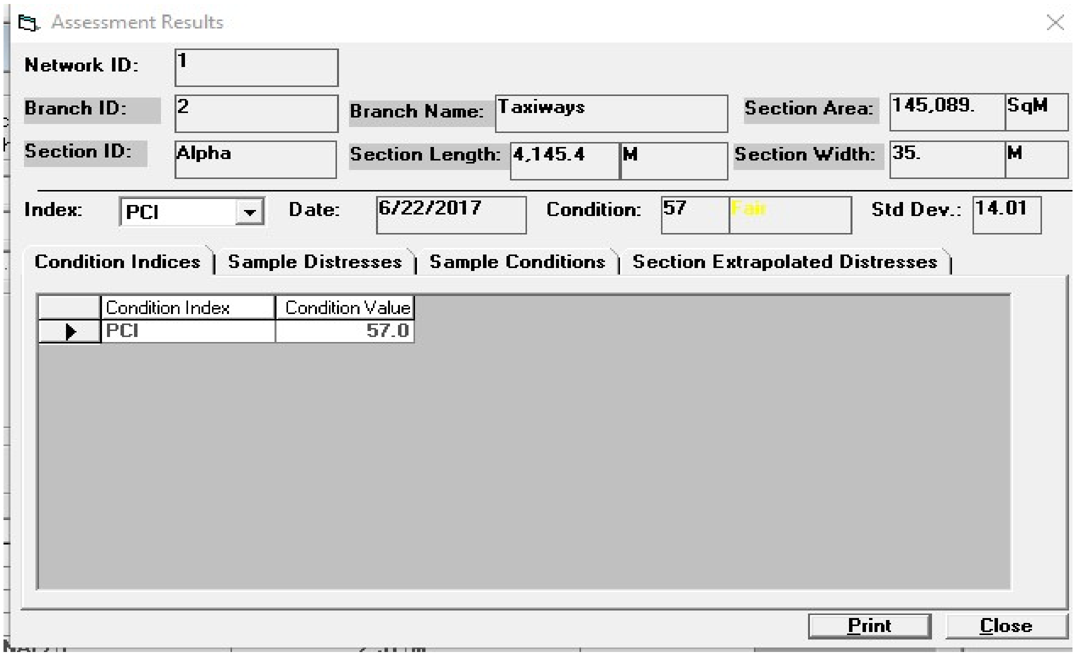


Figure 4.9 Typical Sample PCI Result for The section

11. The next step of the MMS it the prediction model of the pavement. This step is generated on the Paveair by selecting the prediction modelling tab then prediction curve as shown in Figure 4.10.

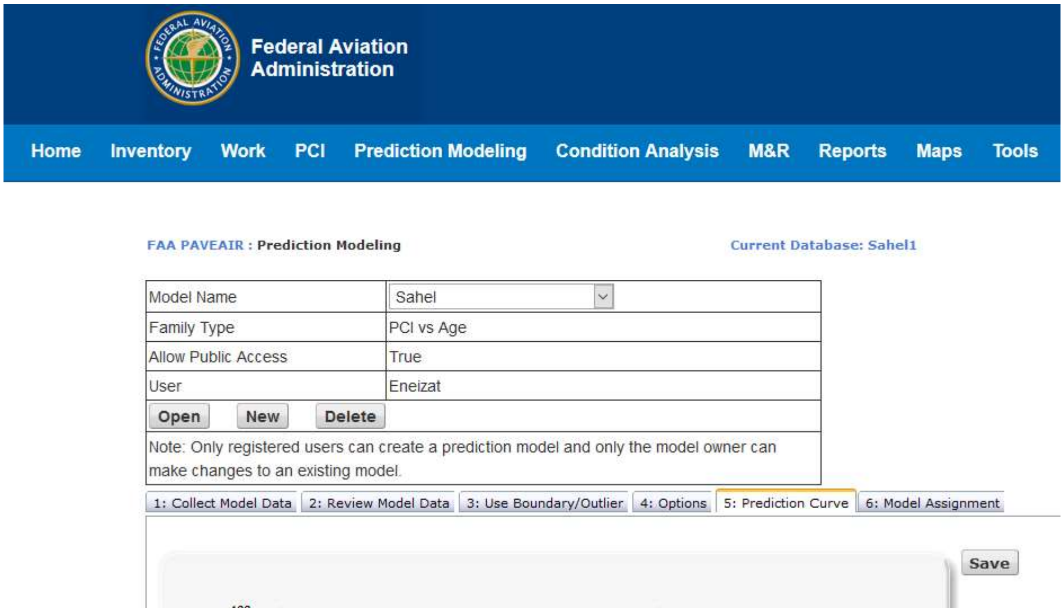


Figure 4.10 Typical Prediction Model for MMS

12. The prediction modelling curve will be shown after pressing the prediction curve tab and after selecting the data base as shown in the Figure 4.11.

    The prediction models was presented in article 3.5.2.

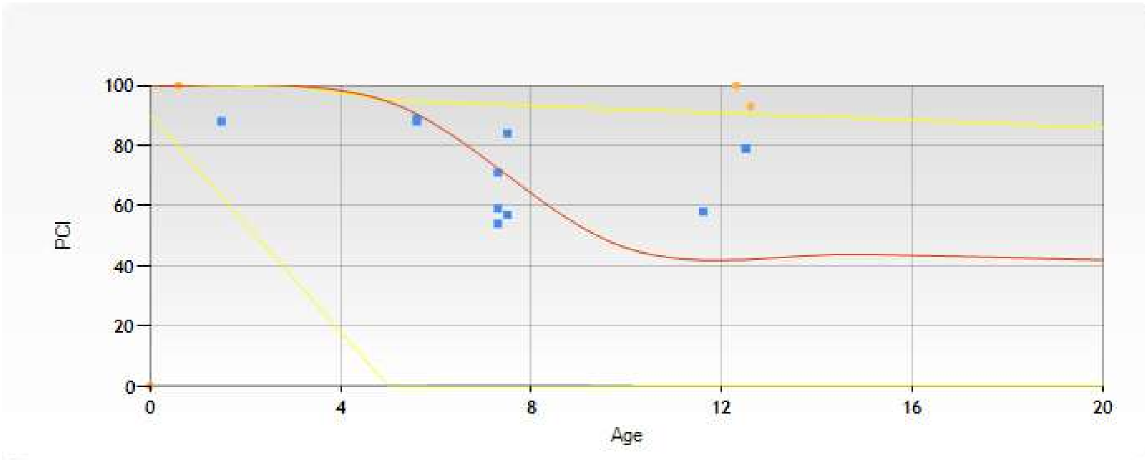


Figure 4.11 Prediction Curve

13. After the condition analysis tab selected from the Paveair and the condition date is entered as 5 years in condition start date and years as shown in the below Figure 4.12

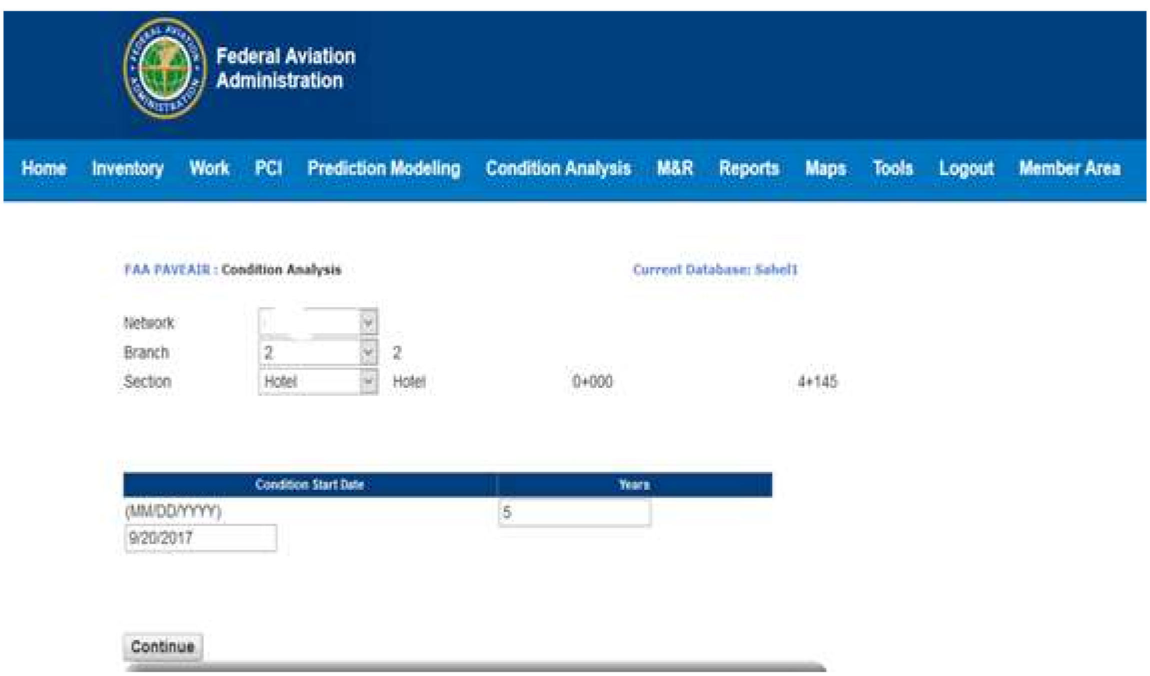
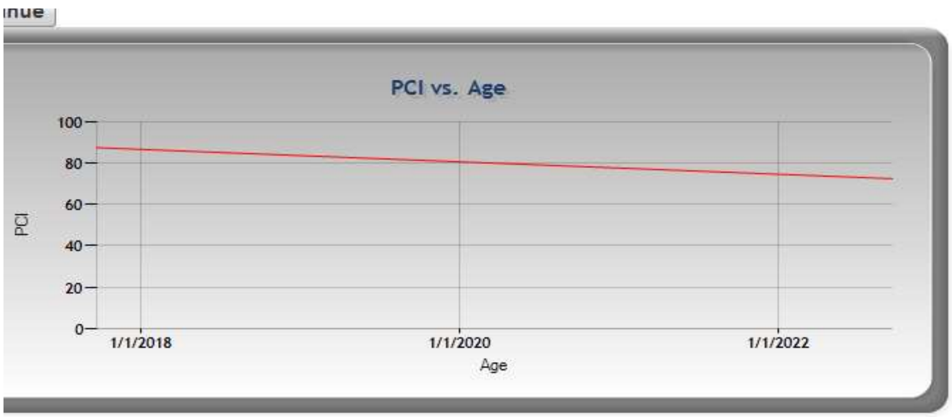


Figure 4.12 Condition Analysis for The Data

14. Once the continue button pressed. The condition curve and data will appear as shown in the Figure 4.13 as described in chapter 3 article 3.5.2.



etwork	Branch	Section	Date	Activity	PCI	Age	Area	Unit
	2	Hotel	7/16/2017	Inspection	88	1	145089	m²
	2	Hotel	7/16/2018	Family Curve	85	2	145089	m²
	2	Hotel	7/16/2019	Family Curve	82	3	145089	m²
	2	Hotel	7/16/2020	Family Curve	79	4	145089	m²
	2	Hotel	7/16/2021	Family Curve	76	5	145089	m²
	2	Hotel	7/16/2022	Family Curve	73	6	145089	m²

Figure 4.13 Condition Analysis Curve and Data

Figure 4.13 shows the prediction value of PCI for each section while Figure 4.11 shows the prediction model for the whole network based on historical data for all section and branch.

15. Determination of M&R plan , the last step in MMS is the M&R plan determination and start by clicking on M&R tab as shown in Figure 4.14 , the M&R tab in Paveair include :

- M&R management is used to create the New M&R plan , Name and type
- M& R Tables for local M&R, Global, cost and budget and the modification of any file form this tab.
- The three type of M&R plan (Consequence of Local Repair, Minimum condition and critical PCI)

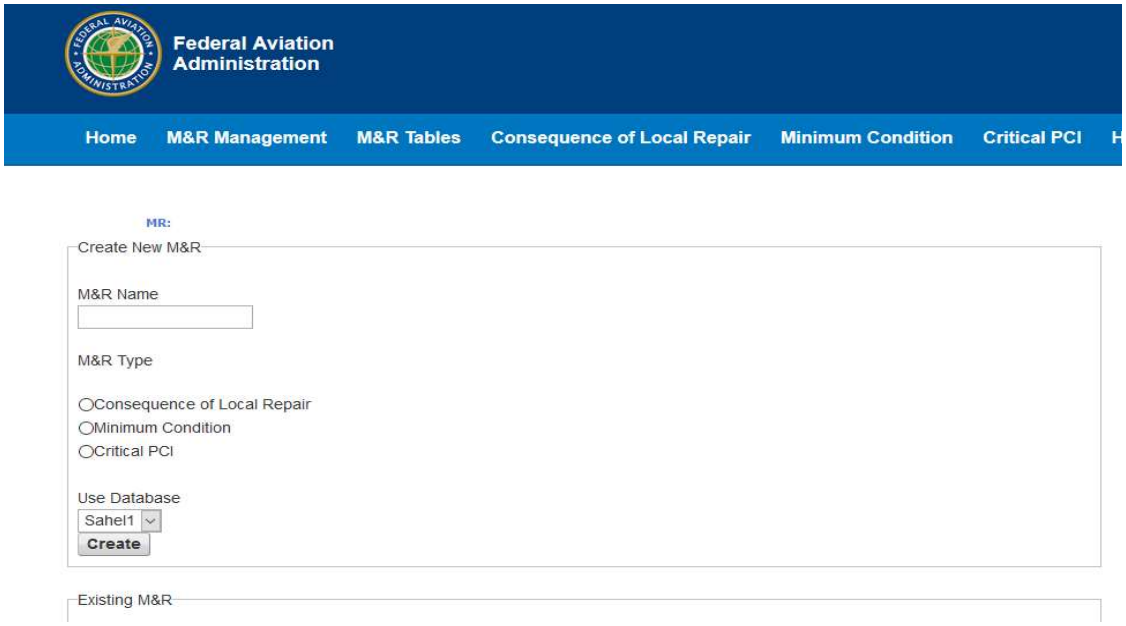


Figure 4.14 Typical M&R Creation

16. The annual M&R is created by clicking on the Consequence of Local Repair tab. This type of M&R is used to calculate the cost and resulting condition of immediate implementation of local M&R for the most recent inspection year as shown in Figure 4.15.

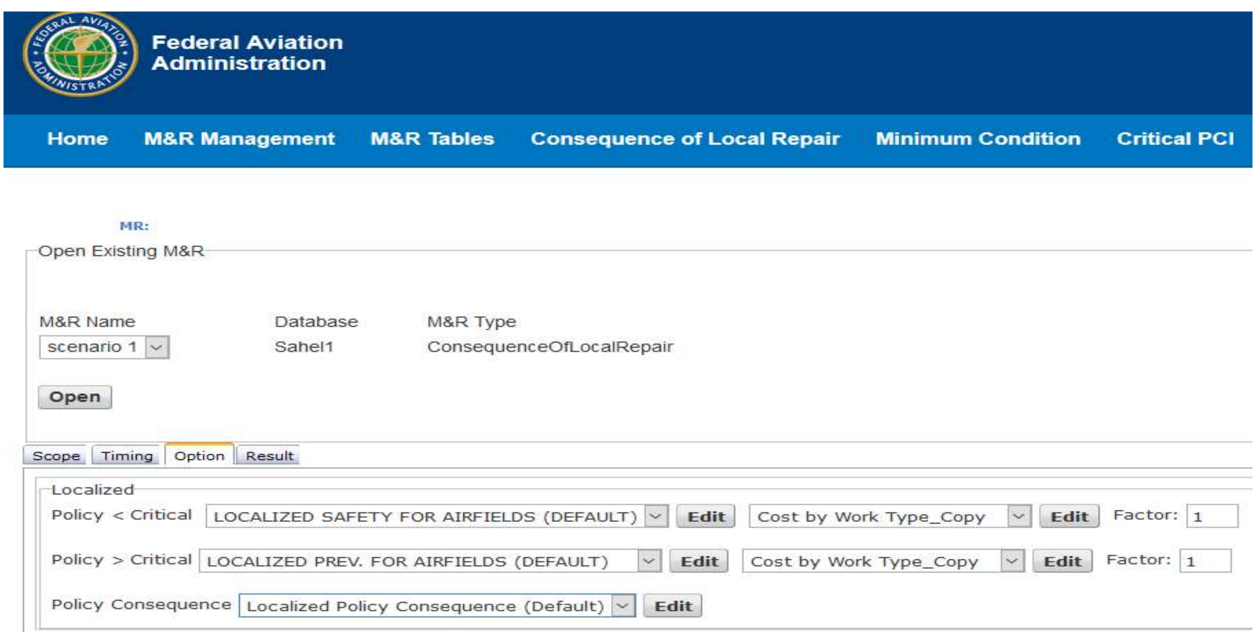


Figure 4.15 Typical Annual M&R Creation

- The result is generated as excel file format include two files: first file summary of the applied consequence policy .And the second file include the detail of the applied policy.

17. The Five year plan is generated by clicking on the critical PCI and select the tab of determine the budget requirement form plan mode tab. Then from polices and cost tab the policies is selected as shown in Figure 4.16.

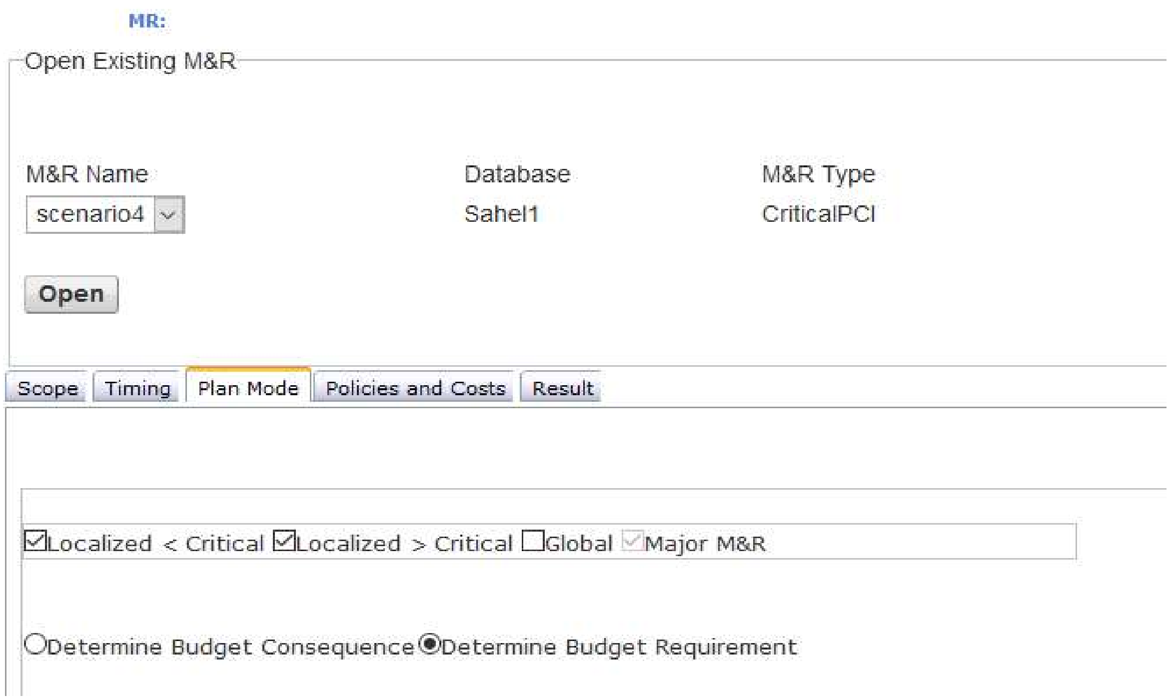


Figure 4.16 Typical Five Year Plan M&R Creation

18. The reporting issue in the MMS just by clicking on the Report tab there will be list of reports that can be selected as per needed information.

Figure 4.17 shows a management flow diagram for MMS implementation for airfield pavement

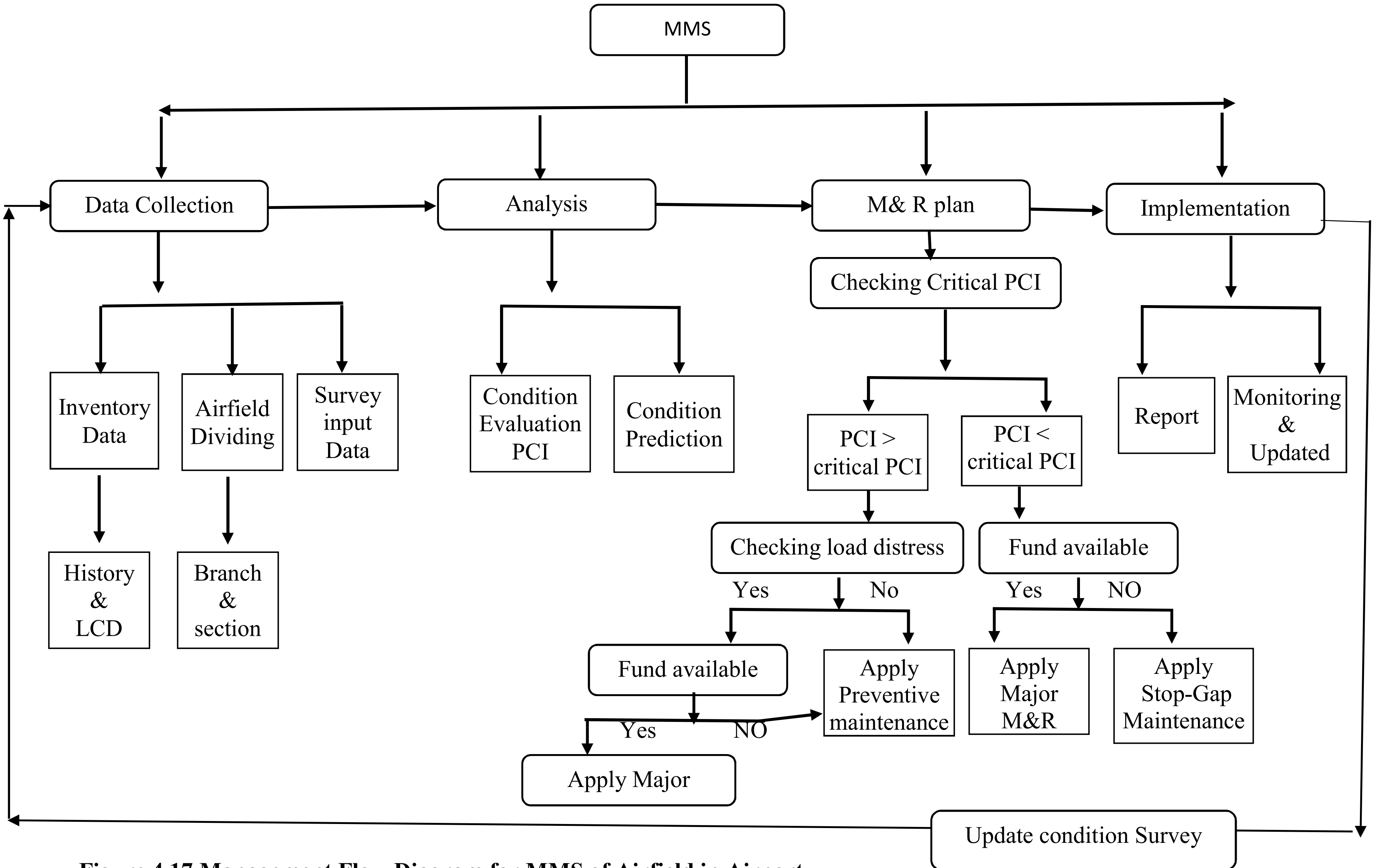


Figure 4.17 Management Flow Diagram for MMS of Airfield in Airport

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Abstract

Maintenance Management for Airport Airfield Using MicroPaver Computer Software "Case Study"

Sahel Mohammad Eneizat

Maintenance management system and Airport Pavement Management System (APMS) developed and found by airport agencies and operator to keep the facilities in airfield running in full capacity. The expert system such as Pavement Management System (PMS) found and developed in the late of 1970s such as Micro Paver to help airport management in their decision regarding maintenance activity in the airfield.

Research aims is to construct and establish Maintenance Management System (MMS) for airport with systematic procedure for maintaining and updating the pavement condition. Since the airfield pavement represent an important infrastructure in the airports. This infrastructure requires care through periodic evaluation and continuous maintenance to keep the airfield pavement operation under acceptable level of service.

In this study, historical data of airfield pavement distress were collected. These data categorized and analyzed using Micro Paver and Paveair softwares which are used to calculate current pavement condition and the future condition prediction.

The study was conducted on airfield pavement of international airport. The selected airfield contains: two parallel runways, fourteen taxiway, and seven aprons which are includes commercial apron, cargo apron and maintenance apron. Visual condition survey were conducted and the analysis performed to determine the effective maintenance selection, budget determination, and budget prioritizing for current and future condition.

The proposed APMS include four major components: Data collection, Data Analysis, Maintenance and Rehabilitation plan (M&R) and implementation.

Key Word: Airport Pavement Management System (APMS), Maintenance Management System (MMS), Maintenance and Rehabilitation (M&R), Micro paver Software, and Paveair software

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جامعة الإسراء
Isra University

Maintenance Management for Airport Airfield Using MicroPaver Computer Software

"Case Study"

By

Sahel Mohammad Eneizat

Supervisor:

Prof. Dr. Basim Jrew

This Thesis was submitted in Partial Fulfillment of the Requirements for the Master's Degree in Engineering Project Management

Isra University

November -2017

Amman –Jordan

Isra University

Authorization Form

I, Sahel Mohammad Eneizat, authorize Isra University to supply copies of this thesis to libraries or establishments or individuals on request according to Isra University regulations.

Signature: Sahel

Date: 28.11.2017

Committee Decision

This Thesis (Maintenance Management for Airport Airfield Using MicroPaver Computer Software "Case Study") was Successfully Defended and Approved on 16-November- 2017.

Examination Committee	**Signature**
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Dedication

To

My Father

For earning an honest living for us and supporting and encouraging me to believe in myself

My Mother

Who taught me to trust in Allah

To My Brothers

Who always beside me in whole my life

Acknowledgements

After an intensive period of seven months, today is the day: writing this note of thanks is the finishing touch on my dissertation. It has been a period of intense learning for me, not only in the scientific arena, but also on a personal level. Writing this dissertation has had a big impact on me. I would like to reflect on the people who have supported and helped me so much throughout this period.

I would first like to thank my thesis advisor Prof. Basim Jrew at Isra University . His office was always open whenever I had a question about my research or writing. His guidance helped me in all the time of research and writing of this thesis. I could not have imagined having a better advisor .He consistently allowed this paper to be my own work, but steered me in the right direction whenever he thought I needed it.

Besides my advisor, I would like to thank the rest of my thesis committee: Prof. Subhi Bazlamit at Al Zaytoonah University of Jordan, and Dr. Majed Msallam at Isra University, for their encouragement, insightful comments, and hard questions.

Particular thanks go to My Friends Ahmad Odeh , Mohammad Abu shawish and Mohmmad Amro for generous effort in helping me through distress input survey collection.

Finally, I must express my very profound gratitude to my Father, Mother, Brothers and friend for providing me with unfailing support and continuous encouragement throughout my years of study and through the process of researching and writing this thesis.

This accomplishment would not have been possible without them. Thank you.

Sahel Eneizat

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List of Abbreviations

AC	Asphalt Concrete
PCC	Portland Cement Concrete
USA-CERL	United States Army Construction Engineering Research Laboratory
USDT	United States Department of Transportation
FAA	Federal Aviation Administration
M&R	Maintenance and Rehabilitation
USACE	United State Army Corps of Engineer
PCI	Pavement Condition Index
APMS	Airport Pavement Management System
PMS	Pavement Management System
MMS	Maintenance Management System
PCASE	Pavement Computer Assisted Structural Engineering
PCN	Pavement Classification Number
ACN	Aircraft Classification Number
NASAO	National Association of State Aviation Officials
SWY	Stop Way of the Runway
PMS	Pavement Management System
ICAO	International Civil Aviation Organization
ASTM	American Society for Testing and Materials
AASHTO	American Association of State Highway and Transportation Officials
HMA	Hot Mix Asphalt
HWD	Heavy Weight Deflectometer
FOD	Foreign Object Debris
BBI	Boeing Bump index
CFME	Continuous Friction Measurement Equipment
mm	millimeter

LTD cracks	Longitudinal, Transverse and Diagonal Cracks
ASR	Alkali-Silica Reaction
PSI	Present Serviceability Index
PSR	Present Serviceability Rating
DV	Deduct Value
TDV	Total Deduct Value
ROI	Rate Of Interest
GIS	Graphical Information System
LCD	Last Construction Date
NATO	North Atlantic Treaty Organization
CTB	Cement Treated Base
SAMI	Stress Absorption Membrane Interlayer
RWY	Runway
TWY	Taxiway
APC	Asphalt over Portland Cement Concrete
JOD	Jordanian Dinar

List of Appendices

Abstract

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Maintenance management system and Airport Pavement Management System (APMS) developed and found by airport agencies and operator to keep the facilities in airfield running in full capacity. The expert system such as Pavement Management System (PMS) found and developed in the late of 1970s such as Micro Paver to help airport management in their decision regarding maintenance activity in the airfield.

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Chapter One

Introduction

1.1 Background

The main purpose of maintenance management is to keep the facilities in Airfield running in full capacity and to be repaired as per the management system not only in case of broken or visible defect of the facility surface. These practices of maintenance will help in cost saving as long term view and plans.

Usually there are two types of maintenance first is the preventive maintenance this type scheduled to avoid any sudden failure or unexpected failure. The second type of maintenance is called corrective maintenance which is the most expensive. If not performed, it may cause excessive damage in the network.

Airports pavement in airfield usually design as flexible pavement or rigid pavement. The flexible pavement constructed with treated bituminous (treated surface) or thin layer of hot mix asphalt with high quality material to resist surface stress which caused by the aircraft loading wheels and to resist the erosion by environment. This black topped layer laid over base course and subgrade layer. The second type of pavement is called the rigid pavement which constructed from Portland cement concrete slab (PCC) or reinforced concrete slab. The difference between these types based on load distribution over subgrade: the rigid pavement has higher modulus of elasticity to distribute the load over wide area of subgrade.

In this study a Computer software was used for maintenance management which is widely used in airfield. Two combined software were used (Micro paver and Paveair) these two software created, funded and developed by United States Army Construction Engineering Research

Laboratory (USA-CERL) after agreement between Federal Aviation Administration (FAA) and United States Department of Transportation (USDT). Paveair software available online on FAA website.

1.2 Research Objectives

Research objectives to obtain, provide, establish maintenance management system for the airfield in an international airports as the follows:

1. Establish, construct solid data base for the airport facilitate include historical data, construction data, maintenance data …etc.
2. Evaluate the pavement conditions at airfield by systematic process as: including pavement inventory, assessment of the current pavement condition, and develop procedure to predict the future condition
3. Integrate Micro paver in airfield pavement system and to report the past and future performance of airfield pavement.
4. Establish maintenance management system for airfield and compare it with the current system by using the micro paver software and develop the scenario for maintenance and rehabilitation (M&R) based on budget or operational condition requirements.

1.3 Research Methodology

The research methodology is divided into four phases to achieve the research objectives and to complete the thesis:

- **Phase one** : literature review for relevant research, book, journal which is related to the maintenance management and the application of micro paver in airfield

- **Phase two** : data inventory and data collection for the runway and taxiway and other facilities inside the airfield (case study)
- **Phase three** : data analysis for the phase two
- **Phase four:** implementation and development the MMS for the selected Airfield Airport case study.

1.4 Case Study

The study was conducted on airfield pavement of international airport. The selected airfield contains: two parallel runways (south and north), fourteen taxiway (including high speed exit taxiway) and seven aprons which includes commercial apron, cargo apron and maintenance apron. Mainly Micro paver and Paveair softwares based on Pavement Condition Index (PCI). The PCI value based on distress types, severity and quantity of deterioration.

1.5 Related Research and Studies

This section shows briefly the related works and research which have focused on pavement maintenance management system for the airfield.

Gendreau and Soriano (1998) the evaluation performance procedure of airfield pavement in APMS is developed in 1970s by United State Army Corps of Engineer (USACE) as PAVER concept and capability. The evaluation process include some measure help in pavement management process such as: variation of PCI within section, rate of deterioration including any rapid degrading and causal factor of distresses (load, climate or other factor).

Greene et al (2004) assessment of the airfield pavement is important and essential for safe operation of aircraft and pavement performance. Condition assessment performed based on condition index include the PCI, foreign object damage potential index, structural index based on nondestructive test and friction index based on skid resistance measurement.

The PCI is a numerical value from 0 to 100 determined based on distress type, quantity and severity. The PCI also is a rating scale for the pavement: good, fair, poor.

The foreign object damage potential index is a scale from 0 to 100, with being 0 no foreign object potential and 100 high foreign object potential and the operation not allowed on that section of airfield pavement .The effect of these loose object on runway from pavement distress can cause serious damage to aircraft engine, causing costly damage and safety hazard.

Structural index mainly based on non-destructive test such as falling weight deflectometer. The result of structural index analyzed based on layered linear – elastic model and it calculated using computer software such as PCASE (Pavement Computer Assisted Structural Engineering) were developed and continually updated by United State Army Corps of Engineering. Output from PCASE software Pavement Classification Number (PCN) which represent the capability of pavement to support aircraft .Usually the Aircraft Classification Number ACN/PCN ratio used for evaluation criteria of structural index as following:

- Good: ACN/PCN ratio <1.1,
- Fair: ACN/PCN ratio between 1.1 and 1.4
- Poor: ACN/PCN ratio >1.4.

Larkin and Hayhoe (2009) the Paveair software is developed based on agreement between FAA and National Association of State Aviation Officials (NASAO) as nondestructive test to assess airport pavement condition. Paveair web based pavement evaluation and management program with equivalent function of Micro paver-5.

Federal Aviation Administration (FAA) – AC 150 / 5380-7B (2014) Airport Pavement Management System (APMS) consider systematic procedure for establishing and constructing policies, defining and setting the priorities, allocating the resources and determination of the budget requirement for pavement maintenance, rehabilitation or reconstruction.

The APMS provides agent or airport operator (maintenance division) by some recommendation to maintain the pavement network at acceptable level of service with minimum cost of maintenance.

The main purpose of APMS not only to evaluate the current condition of the airfield pavement, but also to predict the future condition of the pavement using the PCI. Once the prediction model for pavement generated the rate of deterioration and the life cycle cost analysis can be made to be used for the alternative of M&R. Also the optimal solution and time to apply the selected M&R to avoid higher cost of M&R in the future.

In general the pavement performance will reach to the critical condition after that the deterioration will increase rapidly. Thera are many factor that keep the pavement in good condition and before reaching the critical condition which consider the rapid deterioration point such the following factors: construction type, quality, pavement use and traffic, environment and maintenance. The following benefit of APMS are:

- Documentation of pavement data for current and future condition.
- Increase the useful life of pavement.
- Objective evaluation for pavement condition.
- Systematic procedure for budget determination and M&R alternative.
- Life cycle cost analysis for the M&R.

Humphries and Lee (2015) the main and primary objective of any aviation agency to ensure the airport operating safely. This goal depend on airfield pavement performance and ability to withstand for gross load and high tire pressure from aircraft. Pavement management is complicated and the knowledge in pavement type, treatment and requirements is needed from airport management.

PMS information include: indicator shows when pavement work is needed, cost information, benefit of treatment, pavement maintenance plans and the time frame of the applied treatment

1.6 Thesis structure

This thesis consist five chapter as following:

- **Chapter one:** this chapter will include introduction including the research problem, research methodology and research objective.
- **Chapter two:** this chapter will include a detailed literature review and previous works related to maintenance management in airport airfield.
- **Chapter three:** this chapter will include methodology, data collection and data analysis.
- **Chapter four:** this chapter will include development of proposed Maintenance management system and implementation.
- **Chapter five:** conclusion & recommendation.

Chapter Two

Literature Review

2.1 Introduction

Maintenance management for airport airfield needed to support the engineering and management to provide safe and efficient operational facilities of airports. Since the airfield pavement consider as the first and most important facility in the airports. Due to the importance of airfield pavement all operation of airports will be effected in case of any damage or failure to the airport pavement. Also the pavement management system a broad function that use pavement evaluation and pavement performance trends as a basis for planning, programming, financing, and maintaining a pavement system.

Airfield pavement is complex structure of design also in construction, the pavement constructed to provide sufficient support of load generated by aircraft weight and to withstand without any damage due aircraft movements and traffic action. According to FAA the design theory of airport pavement was based on elastic theory of flexible pavement and three – dimensional finite element theory of rigid pavement. These two theories focused on the landing gear effect (FAA-AC 150/5320-6F).

The maintenance for airfield pavement and specially runway pavement decision in the past based on the previous experience of airport operator engineers or based on an urgent needed without any scientific or sophisticated method. This type of maintenance without any optimality of effectiveness consideration, later some agencies starts using note card for prioritizing the maintenance activity. But also this type found not effective for resource selection and maintenance strategies that used for airport pavement and for road pavement. (Kazda & Caves 2010)

2.1.1 Main Airport Airfield Characteristic

The main characteristic of airport airfield including the runway, taxiway, rapid speed exit taxiway and aprons the description of airfield is shown in the Figure 2.1.

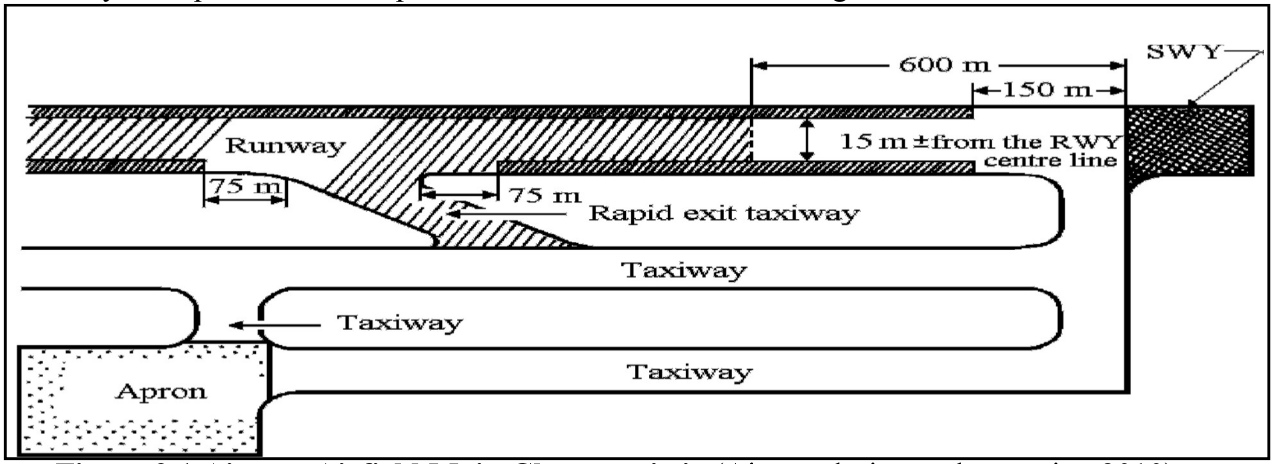

Figure 2.1 Airport Airfield Main Characteristic (Airport design and operation 2010)

Where SWY: Stop way of the runway

The following are the definition of each part of airfield:

1- **Runway**: define as the rectangular area on airfield land used for landing and take-off purpose and the runway it can be parallel, perpendicular, crossed, open V or extended V based on available lands orientation also the wind direction.

2- **Taxiway**: define as the path on an airfield land constructed and established for aircraft taxing form one part to other like apron, runway …etc

3- **Rapid speed exit taxiway**: the taxi way that connect to the Runway at specific angle and design to allow landing aircraft turn off higher speeds to minimize the runway occupancy and to move to the other taxiway that connected to aprons.

4- **Apron**: defined area on airfield land that used for different purposes like loading or unloading passengers, cargo, fueling, parking or maintenance.

5- **Stop way:** is an area beyond the runway which can be used for declaration in case of rejected take off (aborted takeoff).

2.1.2 Airport Types (Classification)

The airport classified in five category based on type of activity, these types & category include the following: commercial services, primary, cargo services, reliever, and general aviation airports and below the definition of each type. (Ashford, Mumayiz, and Wright 2011)

1. **Commercial services airport:** these airport that have at least 2,500 passenger boarding each year and received scheduled passenger services including two type non-primary for passenger boarding services between 2,500 and 10,000. And the primary airports for these airports have more than 10,000 passenger boarding each year. May be classified as international airport.
2. **Cargo service airports:** these airports that have total annual landed cargo weight more than 100 million pounds (45360 tons) in addition to transportation services.
3. **Reliever airports:** these airports that used to relieve congestion at commercial airports and to improve and help in general aviation access to the community. This type assigned by the aviation regulator and it can be public or private owned. May be classified as domestic airport.
4. **General Service's airports:** these type include the remaining types not included in the above and that have less 2,500 passenger boarding services each year. And these airport public or private owned. May be classified as utility airport.

The above definition as per the 1982 laws, the airport can classified bases on flight types like international or domestic flight. Also the airports can be utility airports for these airports that provide as example: emergency services, charter or critical passenger service, flight training and personal flying also it called basic airports.

Chapter Five

Recommendations and Conclusions

5.1 Conclusions

Based on the data obtained from the case study for international airport and analysis by the Micro paver and FAA Paveair (available online). These two expert system of maintenance management present the current condition, prediction condition and M&R as explained in chapter 3 and chapter 4.

The following conclusions can be drawn from this study:

1. 53% of the distress observed on the airfield pavement is caused by loading condition, the climate (environmental) is caused 35% and the remaining 12% caused by other reason such as (bleeding , oil spillage, corrugation , joint spalling and corner spalling) .
2. The result of PCI for airport as overall average is 56 that mean the airport in “Fair” condition rating. The total section of the airport 23 sections as the following : 5 sections with “good “ condition rating with average PCI 92 , 4 sections with “satisfactory” condition rating with average PCI 78 , 6 sections with “Fair” condition rating with average PCI 60, one section with “Poor” condition rating with average PCI 55, two sections with “Very Poor” condition rating with average PCI 28, two sections with “Serious ” condition rating with average PCI 15, and three sections with “Failed ” condition rating with average PCI less than 10 .
3. The result of PCI based on airfield pavement area are 75% of the pavement in fair condition rating and above , 2% in poor condition rating , 15% in very poor condition rating , 5% in serious condition rating , and 3 % in Failed condition rating .
4. The prediction condition for the whole airfield pavement after 5 year by using Micro paver and Paveair software shows that the PCI for the airfield pavement after five year will

become 45 in poor condition rating, the reduction value of PCI around 19 %. The PCI for the branch number 1 " Runway branch " decrease from 79 to the 66.5 in fair condition rating .PCI for the branch number 2 " Taxiway branch " decrease from 53 to 43 in poor condition rating . PCI for branch number 3 "Apron Branch "decrease from 53 to 44 in poor condition rating.

5. The critical PCI which used in this study 55. Critical PCI is represent condition of airfield pavement at or below which rehabilitation or reconstruction is typically recommended for these section.
6. The PCI value calculated by Micro paver 5 compared with the manually calculated is almost the typical. But the Micro paver 5 used for time saving.
7. Annual & five year M&R budget performed by using Paveair for the airfield pavement of this case study.
8. The annual M&R budget was determined as 96,000 JOD excluding the slab replacement for the first year.
9. Both Expert system (Micro Paver 5 and Paveair) are good tools for MMS to help the decision maker in their decision and in MMS improvement including the following : inventory and data base generation , determine of the current condition , prediction of the pavement future condition , developing and generation of the M&R plans , and extracting the reports for managements .
10. Proposed MMS consider as the third approach of MMS in this type evaluation of M&R based on indicator (repeaTable scale such as PCI) plus the future factor of the pavement to be taken into consideration with most economical alternative selected as life cycle cost.

5.2 Recommendations

The following recommendations are listed below:

1. The MMS developed in this research should be utilized and used by the airport operator to implement the M&R strategy.
2. The proposed MMS should be updated and kept as database for the airfield pavement including: historical data, condition data and maintenance strategy.
3. The pavement condition assessment survey is recommend to be performed every 2 to 3 years of the airfield pavement, and for the runway it is recommended to be performed maximum every two year to keep good tracking of deterioration due to the importunacy of the runway.
4. Highly recommended is to provide periodical training for maintenance staff and engineering staff of airport operator with the required software such as paver 7 software and also prober training for everyone involved in management cycle.
5. The airport operator should use the new technology of automated distress data collection and distress measurement such as: 35-mm analog continues film, digital line scan imaging and digital camera connected with server instead of personal effort. This will save time and effort.
6. Future development should be conducted to integrate Micro paver (paver) and geographical information system (GIS) for airfield pavement.
7. The MMS should be applied for the service road inside the airfield and access road to the airport which are not included in this case study.

8. Future studies should be conducted to compare the result of APMS for international airport by Micro Paver and Paveair softwares with other expert system including all advantage and disadvantage.
9. Future studies are needed to apply the MMS for the other airport type such domestic, service, general, utilities ... etc.

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Appendices

1. Appendix A: Airfield Pavement Distresses
2. Appendix B: Input Data of Condition Survey.
3. Appendix C: PCI output
4. Appendix D: Future Prediction of PCI value
5. Appendix E: M&R plan for one year
6. Appendix F: M&R plan for five year

Appendix A

Airfield Pavement Distresses

Airfield Pavement Distresses

The pavement deterioration causes due to many factors such as: structural, climate (weather and /or environment), material, age or the combination of these factors (category).

The distresses are different for the each type of pavement as follows:

I. Flexible Pavement Distresses

The surface distresses for flexible pavement 17 type of distresses according to the paver distress identification manual and FAA Guidelines and procedure for maintenance of airport pavement AC-150/5380-6C , the distresses for flexible pavement in four major categories : Cracking, Disintegration, Distortion and Loss of skid resistance.

1. Alligator cracks

The alligator cracks it called also as Fatigue or crocodile cracks, these cracking is a series of interconnected cracks caused by fatigue failure of asphalt layer under repeated aircraft load, the cracks start at the asphalt surface layer where the tensile stress and strain highest under aircraft wheels, the alligator cracking consider as major structural distress and it measured by square meter or square feet of surface area, also it come in three levels of severity as below.

A) Low Severity Level

Low severity cracks it a fine or hair cracks in parallel to each other and few cracks connected to each other and the cracks not spalled as shown in the Figure 1.

Figure 1 Low Severity Alligator Cracks

(http://www.dot.state.pa.us/appliedpavement/index.)

B) Medium Severity Level

Medium severity alligator cracks defined as the network of light cracks that interconnecting and lightly spalled also all the piece of surface securely held in place, the interlock between aggregate pieces good and secure and all these light cracking start in development as pattern as shown in the Figure2.

Figure 2 Medium Severity Alligator Cracks

(http://www.dot.state.pa.us/appliedpavement/index.)

C) High Severity Level

The high severity of alligator cracks once the cracks networks and pattern appeared and progressed and the pieces it can be defined easily by inspector or airport operator staff and some of these cracks may generate FOD as per Figure 3.

Figure 3 High Severity Alligator Cracks

(https://faapaveair.faa.gov/Help/default.htm.)

2. longitudinal and transverse cracks

Longitudinal cracks these cracks parallel to the pavement center line and the transverse cracks these cracks extend across to pavement centerline and these cracks may be result from poor construction for paving lane joint, shrinkage and thermal change of temperature of AC surface or reflective cracks caused by cracks beneath surface of AC including cracks from PCC slabs (PCC joint excluded), these type of cracks not associated to the load, the longitudinal and transfers cracks measured by liner meter ,with three levels of severity as shown and described below.

A) Low Severity Level

The low severity consider for average cracks width less than 6 mm or less for non-filled cracks and any width for filled cracks by filler material ,and if the light spalling exist the cracks consider as low severity and for Porous layer if the average raveled area around cracks width less than 6 mm as Figure 4.

Figure 4 Low Severity L & T Cracks

(http://www.dot.state.pa.us/appliedpavement/index.)

B) Medium Severity Level

If the cracks width between 6 mm and 25 mm and the cracks generate some FOD also moderately spalled consider as medium severity also the same for Porous layer as shown in Figure 5.

Figure 5 Medium Severity L & T Cracks

(http://www.dot.state.pa.us/appliedpavement/index.)

C) High severity level

If the cracks width more than 25 mm and for these cracks severely spalled and some loose pieces that caused and generate FOD, also for porous layer if the raveled area around cracks more than 25 mm as shown in Figure 6.

Figure 6 High severity of L & T cracks

(http://www.dot.state.pa.us/appliedpavement/index.)

3. Joint Reflection Cracks

This type of distress appeared only if we have AC laid over PCC slab and these crack come from joint between slabs mainly it caused by movement of PCC slab due to thermal and moisture change also it may be occur if we have overlay of HMA pavements and the old pavement cracks not repaired properly and it measured by linear meter with three levels of severity as below.

A) Low Severity Level

If the cracks width less than 6 mm and light or no FOD generated from cracks it consider as low severity cracks as shown in Figure 7.

Figure 7 Low Severity Joint Reflection Cracks

(PAVER distress identification manual)

B) Medium Severity Level

If the cracks width between 6 mm and 25 mm and the cracks generate some FOD also moderately spalled consider as medium severity as shown in the Figure 8.

Figure 8 Medium Severity Joint Reflection Cracks

(https://faapaveair.faa.gov/Help/default.htm.)

C) High Severity Level

If the cracks severely spalled and some loose pieces that caused and generate FOD it consider as high severity as shown in Figure 9.

Figure 9 High Severity Joint Reflection Cracks

(https://faapaveair.faa.gov/Help/default.htm.)

4. Block Cracks

Block cracks are interconnected and shown as rectangular pieces with different size start from 0.3 meter to 3 meter and these cracks mainly caused by thermal change cycle causing shrinkage to the AC surface which result in daily stress/ strain cycling, these type usually occur over large area of pavement including courage way and out of courage way also it not associated to aircraft load, the block cracks give indication the pavement hardened significantly , and these cracks measured by square meter with three levels of severity as described below .

A) Low Severity Level

The low severity of block cracking defined as the cracks that non-spalled or lightly spalled with no FOD generation and the mean width of these cracks 6 mm or less as shown in Figure 10.

Figure 10 Low Severity Block Cracks

(http://www.dot.state.pa.us/appliedpavement/index.)

B) Medium Severity Level

Medium severity of block cracking for these cracks moderately spalled or minor spalling and these crack generate FOD with mean depth greater than 6 mm for filled and non-filled cracks as shown in the Figure 11.

Figure 11 Medium Severity Block Cracks

(http://www.dot.state.pa.us/appliedpavement/index.)

C) High Severity Level

High severity of block cracks defined as the cracks that are severely spalled and it generate FOD as shown in Figure 12.

Figure 12 Medium severity of block cracks

(https://faapaveair.faa.gov/Help/default.htm.)

5. Slippage Cracks

The slippage cracks caused by breaking or turning action of aircraft wheels that cause slide and deform of pavement surface ,it takes the half-moon shape and it occurs mainly if the surface strength low or the bond between surface layers and lower layer poor and this type measured by square meter without degrees of severity just indicate the cracks exist .

6. Raveling

Raveling defined as the aggregate particle get out of the position of surface pavement surface layer and loss of asphalt tar binder giving indication that the binder has aged and hardened , also this type of distress generate and cause significant source of FOD , raveling it measured by square meter with three levels of severity as described below .

A) Low Severity Level

Raveling low severity if the number of missing aggregate particle in one square meter between 5 and 20 and the missing aggregate cluster less than 2 percent of examined area, but for the porous layer the missing aggregate cluster not exceed 1 and little FOD as shown in Figure 13.

Figure 13 Low Severity Raveling

(http://www.dot.state.pa.us/appliedpavement/index.)

B) Medium Severity Level

Raveling medium severity if the number of missing aggregate particle in one square meter between 21 and 40 and the missing aggregate cluster between 2 and 10 percent of examined area, but for the porous layer the missing aggregate cluster greater than 1 and less than 25 of examined area and the aggregate or binder has worn away causing some FOD and surface moderately rough as shown in Figure 14.

Figure 14 Medium Severity Raveling

(http://www.dot.state.pa.us/appliedpavement/index.)

C) High Severity Level

high severity raveling if the number of missing aggregate particle in one square meter more than 40 and the missing aggregate cluster make up greater than 10 percent of examined area, but for the porous layer the missing aggregate cluster greater than 25 of examined area, and significant FOD potential, also all mechanical damages caused by hook drags, tire rims, or snowplows as shown in Figure 15.

Figure 15 Medium Severity Raveling

(http://www.dot.state.pa.us/appliedpavement/index.)

7. Weathering

The process of begin wear away of asphalt binder and fine aggregate it called weathering and this process show signs of asphalt aging also it accelerated and increased by climate condition and the first sign the asphalt pavement color fading it measured by square meter with three levels of severity as described below.

A) Low Severity Level

The low severity of weathering recorded when the loss of fine aggregate noticeable and the fading color of asphalt also the edge of coarse aggregate exposed less than 1 mm as shown in the Figure 16.

Figure 16 Low severity Weathering

(https://faapaveair.faa.gov/Help/default.htm.)

B) Medium Severity Level

The medium severity of weathering recorded when the loss of fine aggregate noticeable and the fading color of asphalt also the edge of coarse aggregate exposed up to 0.25 of the longest side and greater than 1 mm as shown in the Figure 17.

Figure 17 Medium Severity Weathering

(https://faapaveair.faa.gov/Help/default.htm.)

C) High Severity Level

The high severity of weathering recorded when the loss of fine aggregate noticeable and the fading color of asphalt also the edge of coarse aggregate exposed greater than 0.25 of the longest side as shown in the Figure 18.

Figure 18 Medium Severity Weathering

(https://faapaveair.faa.gov/Help/default.htm.)

8. Jet Blast Erosion

This type of distress is caused by the engine jest blast of aircraft causing darkened area of pavement surface due to bituminous binder burning or carbonized and it vary in depth up to 13 mm , this type measured by square meter and no severity level only the it recorded it existed.

9. Patching

Patching and utility cut is defined as the area where is the original pavement removed and overlaid by new filler material or HMA, and the patches usually have higher rate of deterioration than original pavement also it affects the ride quality and sometimes it generate FOD , this type measure by square meter with three levels of severity as below.

A) Low Severity Level

Low severity of patching for these patches in good condition and performing well also the FOD generation little or no FOD as shown in Figure 19.

Figure 19 Low Severity Patching

(https://faapaveair.faa.gov/Help/default.htm.)

B) Medium Severity Level

Medium severity of patch when it deteriorated and affect ride quality, and the patch has some FOD also moderate amount of distress is present as shown in Figure 20.

Figure 20 Medium Severity Patching

(https://faapaveair.faa.gov/Help/default.htm.)

C) High Severity Level

If the patch badly deteriorated and it affects the ride quality also it has high FOD presence it consider as high severity level and the replacement patch needed ASAP as shown in Figure 21.

Figure 21 High Severity Patching

(https://faapaveair.faa.gov/Help/default.htm.)

10. Rutting

Rutting it's the surface depression under wheel path, and it's due to deformation in the pavement layer or subgrade and caused by consolidation of lateral movement of material due to traffic load, in some agencies the rutting become noticeable after rain fall once the wheel path filled by water and this type of distress can lead to major pavement structural failure, and it measure by square meter with three level of severity as shown in the Table 1.

Table 2.4 Mean Rut Depth Criteria (ASTM D 5340)

Number	Severity	All Pavement section
1	Low	6 to 13 mm
2	Medium	13 to 25 mm
3	High	More than 25 mm

11. Corrugation

Corrugation is series of closely spaced ridges and ripples occur in regular interval almost each 1.5 meter along pavement, perpendicular to traffic direction and it caused by lack of stability in asphalt mix, poor bond between material layer or unstable pavement surface or base layers and it measured by square meter with three levels of severity as shown in Table 2.

Table 2 Corrugation Measurement Criteria (ASTM D 5340)

Number	Severity	Runways and high speed exit taxiway	Taxiway and aprons
1	Low	Less than 6 mm	Less than 13 mm
2	Medium	6 to 13 mm	13 to 25 mm
3	High	More than 13 mm	More than 25 mm

12. Shoving

The connection area between PCC and the AC where is the joint them it usually growth causing shoves for asphalt or tar surface that cause them to swell and cracks and this type of distress caused by shear movement of interlayer, lateral stress produced by PCC slab during expansion or by lack of stability in the mix, it measured by square meter with three level of severity as Table 3.

Table 3 Shoving measurement criteria (ASTM D 5340)

Number	Severity	Height differential
1	Low	Less than 19 mm
2	Medium	19 to 38 mm
3	High	More than 38 mm

13. Polished Aggregate

Polished aggregate distress it caused by repeated traffic and it present when the portion of aggregate appear and extend over the asphalt in pavement surface regardless it very small or there are no rough or angular particles to provide good skid resistance and this type measured by square meter without level of severity .

14. Bleeding

Bleeding defined as the film of bituminous material appear on pavement surface shiny and glass –like also the surface become sticky, the type caused by the amount of asphalt binder in the mix excessive, the percentage of air void content very low or both so during hot weather the asphalt binder fill the void and then expands out of pavement surface, also the bleeding can occur when the excessive tack coat is applied prior HMA surface placement , and this type measured by square meter without level of severity .

15. Depression

Depression is defined as the lower in elevation of pavement surface comparing to the surrounding pavement and it noticeable during rain fall when the water pond creates and it caused by settlement of foundation during construction or from heavier traffic load than the pavement was designed, depression it cause roughness and hydroplaning of aircraft when it filled with water of sufficient depth, this type measured by square meter with three level of severity as Table 4.

Table 4 Depression Measurement Criteria (ASTM D 5340)

Number	Severity	Runways and high speed exit taxiway	Taxiway and aprons	Details
1	Low	3 to 13 mm	13 to 25 mm	Slight effect on riding quality may cause hydroplaning
2	Medium	13 to 25 mm	25 to 51 mm	Moderate effect on riding quality cause hydroplaning on runway
3	High	More than 25 mm	More than 51 mm	Severely effect on riding quality cause definite hydroplaning

16. Oil spillage

Oil spillage define as any damage to the AC surface because of the oil spilling , fuel or any other solvent that cause deterioration or softening of pavement surface comparing to the surrounding area and this type measured by square meter without level of severity .

17. Swelling

The swelling it defined as the deformation of pavement surface specially the upward bulge in the pavement surface and these swelling it come as gradual waves depend on severity level, also it caused by frost action in subgrade, soil swelling or from blowup in PCC slab for AC over PCC this type measured by square meter with three levels of severity as shown in Table 5.

Table 5 Swelling Measurement Criteria (ASTM D 5340)

Number	Severity	Height differential	Details
1	Low	Less than 19 mm	Barely visible and has a minor effect on pavement's ride quality.
2	Medium	19 to 38 mm	Observed without difficulty and has significant effect on pavement's ride quality.
3	High	More than 38 mm	Readily observed and severely affects the pavement's ride quality.

II. Rigid Pavement Distresses

The surface distresses for rigid pavement 16 type of distresses according to the paver distress identification manual and FAA Guidelines and procedure for maintenance of airport pavement AC-150/5380-6C, the distresses for rigid pavement in four major categories: Cracking, Joint seal damage, Disintegration, and Distortion.

1. longitudinal, transverse and diagonal cracks

The longitudinal, transverse and diagonal cracks these cracks that divide the slab into two or three slab which caused by combination of load repetition, curling stress and shrinkage stress, that indicate the reason may be one of poor construction technique, inadequate pavement layer for applied load or the pavement overloads, this type measured and recorded as one slab with three levels of severity as shown below, the medium and high severity consider as major structural level.

A) Low Severity Level

If the slab has no FOD potential (minor spalling), the slab divided into three pieces by low severity or the non-filled cracks mean width less than 3 mm or filled cracks up to 76 mm width it consider as low severity level as shown in Figure 22.

Figure 22 Low Severity LTD Cracks

(https://faapaveair.faa.gov/Help/default.htm.)

B) Medium Severity Level

If one of these exists it consider as medium severity level: filled or non-filled cracks moderately spalled (some FOD potential) , non-filled cracks mean width between 3 and 25 mm , filled cracks lightly spalled but the filler material unsatisfactory ,or the slab divided into three pieces one if these cracks consider as medium severity as shown in Figure 23.

Figure 23 Medium Severity LTD Cracks

(https://faapaveair.faa.gov/Help/default.htm.)

C) High Severity Level

If one of these exists it consider as high severity level: filled or non-filled cracks severely spalled (definite FOD potential) , non-filled cracks mean width greater than 25 mm ,or the slab divided into three pieces one if these cracks consider as high severity as shown in Figure 24.

Figure 24 High Severity LTD Cracks

2. Corner Break

Corner cracks (breaks) these cracks intersect the slab joints at distance less than or equal one half the slab length on both side measured from slab corner, these cracks caused by load repetition or combined with loss of support and curling stress, the lack of support caused by pumping or loss of load transfer at joint, this type measured and recorded as one slab with three levels of severity as shown below.

A) Low Severity Level

The cracks has minor spalling (no FOD potential), non-filled cracks has width less than 3 mm, or filled cracks with any width , but area between corner and joint not cracked as shown in Figure 25.

Figure 25 Low Severity Corner Break

(https://faapaveair.faa.gov/Help/default.htm.)

B) Medium Severity Level

If one of these exists it consider as medium severity level: filled or non-filled cracks moderately spalled (some FOD potential) , non-filled cracks mean width between 3 and 25 mm , filled cracks lightly spalled but the filler material unsatisfactory ,or the area between corner and joint lightly cracked as shown in Figure 26.

Figure 26 Medium Severity Corner Break

(https://faapaveair.faa.gov/Help/default.htm.)

C) High Severity Level

If one of these exists it consider as high severity level: filled or non-filled cracks severely spalled (definite FOD potential) , non-filled cracks mean width greater than 25 mm , or the area between corner and joint severely cracked as shown in Figure 27.

Figure 27 High Severity Corner Break

(https://faapaveair.faa.gov/Help/default.htm.)

3. Durability Cracks

These cracks which appears as pattern cracks and parallel to the joint, it caused by the concrete inability to withstand environmental factors like freeze cycle and it may lead to disintegration of the concrete within 0.3 to 0.6 m of joint ,and this type measured and recorded as one slab with three levels of severity as shown below.

A) Low Severity Level

If the cracks has no FOD potential and little disintegration occurred , and these cracks occurred in limited area of slab as hairline cracks it consider as low severity as shown in Figure 28.

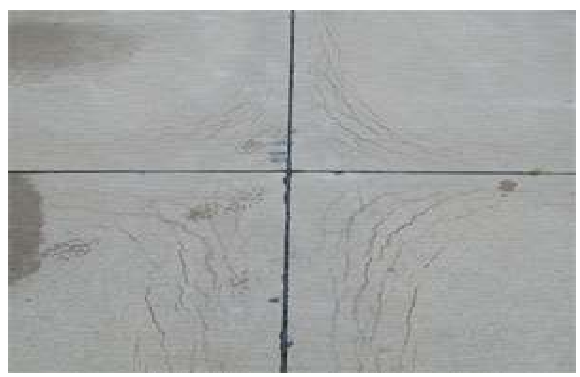


Figure 28 Low Severity Durability Cracks

(http://www.dot.state.pa.us/appliedpavement/index.)

B) Medium Severity Level

If the cracks has FOD potential and pieces are missing and disintegration has occurred, and it occurred in limited area of slab as shown in Figure 29.

Figure 29 Medium Severity Durability Cracks

(https://faapaveair.faa.gov/Help/default.htm.)

C) High Severity Level

The cracks has developed with disintegration and FOD potential over considerable amount of slab as shown in Figure 30.

Figure 30 High Severity Durability Cracks

(http://www.dot.state.pa.us/appliedpavement/index.)

4. Shrinkage Cracks

The hairline cracks which caused during the setting and curing of concrete and extend up to 6mm from surface and not extend across the entire slab also it for few centimeter it consider as shrinkage cracks , and this type measured and recorded as one slab with no levels of severity.

5. Shattered Slab

Shattered slab / intersection cracks defined as the slab that divided into four of more pieces by intersection cracks where caused by overloading from traffic or inadequate foundation support or both, and this type measured and recorded as one slab with three levels of severity as shown below.

A) Low Severity Level

If the slab divided in four or five pieces and mainly these cracks low severity cracks as shown in Figure 31.

Figure 31 Low Severity Shattered Slab

(https://faapaveair.faa.gov/Help/default.htm.)

B) Medium Severity Level

If the slab divided in four or five pieces with more than 15 percent of cracks medium severity or divided in six or more pieces with more than 15 percent of cracks medium or high severity as shown in Figure 32.

Figure 32 Medium Severity Shattered Slab

(https://faapaveair.faa.gov/Help/default.htm.)

C) High Severity Level

If the slab divided in four or five pieces with some or all of these cracks high severity or the slab divided in six or more pieces with 85 percent of cracks low severity as shown in Figure 33.

Figure 33 High Severity Shattered Slab

(https://faapaveair.faa.gov/Help/default.htm.)

6. Joint Seal damage

Joint seal damage is any condition or damage that enable deposit to accumulate in joint or allows significant penetration of water throw joint, these will prevent the slab from expanding it may cause shattering or spalling to the slab, the typical types of joint seal damage are: stripping of joint sealant, extrusion of sealant, weed growth, oxidation of filler, loss of bond with slab edge and lack of absence of sealant ,and this type measured and recorded as overall sample unit with three levels of severity as shown below

A) Low Severity Level

If the overall joint sealant in good condition in the sample unit and the sealant performing well and only minor amount of sealant damaged with low severity as the sealant debonded with joint edge as shown in the Figure 34.

Figure 34 Low Severity Joint Seal Damage

(https://faapaveair.faa.gov/Help/default.htm.)

B) Medium Severity Level

If the overall joint sealant in fair condition in the sample unit and the sealant damaged with medium severity if one off the following exist: water penetrate throw visible opening with width 3 mm, pumping debris are evident, joint sealant is oxidized or the weeds in the joint observed, and the sealant needs replacement within two years as shown in the Figure 35.

Figure 35 Medium Severity Joint Seal Damage

(https://faapaveair.faa.gov/Help/default.htm.)

C) High severity Level

If the overall joint sealant in poor condition in the sample unit and the sealant damaged is at high severity if the 10% of sealant missing or 10 % or more of medium severity criteria above exist and exceed the limitation as shown in Figure 36.

Figure 36 High Severity Joint Seal Damage

(http://www.dot.state.pa.us/appliedpavement/index.)

7. Scaling

It defined as the disintegration of the slab depth if the defect and the loss of wearing surface, scaling include map cracking and crazing the also it caused by construction defect, material defect and environmental defect, construction defect it include the over- finishing (adding water to the surface during finishing) , lack of curing , surface repair with mortar for fresh concrete. Material defect it include the air entrainment for the climate. The environmental effect include the freezing of concrete before adequate strength gained, deicing salt, or thermal cycle from aircraft, and this type measured and recorded as one slab with three levels of severity as shown below.

A) Low Severity Level

Minimal loss of surface paste that poses no FOD hazard. No FOD potential and limited to less than1% of slab area as shown in the Figure 37.

Figure 37 Low Severity Scaling

(https://faapaveair.faa.gov/Help/default.htm.)

B) Medium severity Level

some loss of surface paste that generate some FOD potential and limited to the losses grater than1% and less than 10 % of slab area as shown in the Figure 38.

Figure 38 Medium Severity Scaling

(https://faapaveair.faa.gov/Help/default.htm.)

C) High Severity Level

Low durability that continue to generate FOD and limited to the surface losses greater than 10 % of slab area as shown in the Figure 39.

Figure 39 High Severity Scaling

(https://faapaveair.faa.gov/Help/default.htm.)

8. Alkali-Silica Reaction (ASR)

ASR defined as the chemical reaction between alkalis and certain reactive silica minerals usually alkalis introduced by Portland cement , this reaction form a gel and the gel absorb water causing expansion to the pavement , this may damage the concrete and adjacent structure. ASR indicated by pattern cracking (maps), colored gel (white, brown or other color), or expansion of concrete, and this type measured and recorded as one slab with three levels of severity as shown below.

A) Low Severity Level

If no FOD potential or minimum from cracks or joints and cracks at surface tight (1 mm width), and no evidence for damage or movement for adjacent structure , it consider as low severity as shown in Figure 40.

Figure 40 Low Severity ASR

(https://faapaveair.faa.gov/Help/default.htm.)

B) Medium Severity Level

Some FOD potential and/ or evidence movement of adjacent structure and medium severity different than low by cracks density more, some fragment of slab present, surface popouts may occur, and pattern of cracks wider (1 mm or more) as show in Figure 41.

Figure 41 Medium Severity ASR

(http://www.dot.state.pa.us/appliedpavement/index.)

C) High Severity Level

If the missing concrete fragments present which pose high FOD potential and /or the slab surface function degraded and requires immediate repair as shown in Figure 42.

Figure 42 High Severity ASR

(http://www.dot.state.pa.us/appliedpavement/index.)

9. Joint Spalling

It defined as the breakdown of slab edge parallel to longitudinal and transverse joint within 0.6 m of slab joint, and usually joint spalling caused by excessive stress at joint which caused from weak concrete and joint combined with traffic load or by misaligned dowels in PCC slab, and usually the spall not extend vertically throw the slab but intersect the joint at angle, and this type measured and recorded as one slab with three levels of severity as shown below.

A) Low Severity Level

If no FOD potential or little and the spall is broken into one or two pieces by low severity cracks or by one medium severity cracks as shown in Figure 43.

Figure 43 Low Severity Joint Spalling

(http://www.dot.state.pa.us/appliedpavement/index.)

B) Medium Severity Level

If the spall broken into two or more pieces by medium severity cracks and small fragment may be absent, spall is defined by one severe crack with a few hairline cracks, or spall has deteriorated and causing some FOD potential as shown in Figure 44.

Figure 44 Medium Severity Joint Spalling

(https://faapaveair.faa.gov/Help/default.htm.)

C) High Severity Level

If the spall over 0.6 m long and broken into three pieces of more by one high severity cracks with high FOD potential or joint severely frayed as shown in Figure 45.

Figure 45 High Severity Joint Spalling

(https://faapaveair.faa.gov/Help/default.htm.)

10. Corner Spalling

It defined as the raveling or the breakdown of the slab within 0.6 m of the slab corner and it caused by same reason which cause the joint spalling which mentioned above and its appear sooner than joint , and this type measured and recorded as one slab with three levels of severity as shown.

A) Low Severity Level

If no FOD potential or little and the spall is broken into one or two pieces by low severity cracks or by one medium severity cracks as shown in Figure 46.

Figure 46 Low Severity Corner Spalling

(https://faapaveair.faa.gov/Help/default.htm.)

B) Medium Severity Level

If the spall broken into two or more pieces by medium severity cracks and small fragment may be absent, spall is defined by one severe crack with a few hairline cracks, or spall has deteriorated and causing some FOD potential as shown in Figure 47.

Figure 47 Medium Severity Corner Spalling

(https://faapaveair.faa.gov/Help/default.htm.)

C) High Severity Level

If the spall broken into two pieces of more by one high severity cracks with high FOD potential or spall has deteriorate causing FOD as shown in Figure 2.54.

Figure 48 Medium Severity Corner Spalling

(https://faapaveair.faa.gov/Help/default.htm.)

11. Blow Up

Blow up defined as the expansion of concrete in transvers cracks (joints) in hot weather (additional thermal expansion of concrete) due to insufficient joint width that caused by the inflation of incompressible material at joints, when the expansion not relieve the pressure, buckling to the slab edge (movement upward) will occur, and this type measured and recorded as two slab since the blow up occur in one slab but affect two slab with three levels of severity as shown in Table 6.

Table 6 Blowup Measurement Criteria (ASTM D 5340)

Number	Severity	Runways and high speed exit taxiway	Taxiway and aprons	Details
1	Low	Less than 13 mm	6 to 25 mm	Buckling not rendered and slight amount of roughness exist
2	Medium	13 to 25 mm	25 to 51 mm	Buckling not rendered, and significant amount of roughness exist
3	High	inoperable	inoperable	Severely effect on riding quality cause definite hydroplaning

12. Popouts

Small piece of concrete surface loose that breaks due to freeze cycle combined with expansive aggregate, these popouts has 25 mm to 100 mm diameter and 13 mm to 50 mm depth, and this type measured and recorded as one slab if the three popouts recorded in one square meter for three random area in the slab, and no levels of severity for this type of distress.

13. Small Patch

Small patching is defined as the area where is the original pavement removed and replaced by new filler material, the area of small patch 0.5 square meter, and the patches usually have higher rate of deterioration than original pavement also it affects the ride quality and sometimes it generate FOD, and this type measured and recorded as one slab with three levels of severity as shown in table 7.

Table 7 Small Patch Severity Level Criteria (ASTM D 5340)

Number	Severity	Details
1	Low	The patch performing well with no deterioration
2	Medium	Patch deteriorated or moderate spall or both , minor FOD potential
3	High	Patch deteriorated by spall or cracks , FOD potential exist and it need replacement

14. Large Patch

Large patching and utility cut is defined as the area where is the original pavement removed and replaced by new filler material, the area of large patch over 0.5 square meter, and the patches usually have higher rate of deterioration than original pavement also it affects the ride quality and sometimes it generate FOD, and this type measured and recorded as one slab with three levels of severity as shown in Table 8.

Table 8 Large Patch Severity Level Criteria (ASTM D 5340)

Number	Severity	Details
1	Low	The patch performing well with no deterioration
2	Medium	Patch deteriorated or moderate spall or both , some FOD potential
3	High	Patch deteriorated causing roughness or FOD potential or both

15. Pumping

Pumping define as the ejection of material like gravels, sand, clay or silt by water through joint caused by slab deflection when it loaded, also it include the surface staining , the pumping near joint indicate poor joint sealant , poor joint load transfer or presence of ground water , and it can occur to the cracks in slab as well as joint , and this type measured and recorded as two slab since pumping occur in one slab but affect two slab and if the other joint affected one slab added, with no levels of severity.

16. Faulting or Settlement

Faulting of settlement define as the difference in elevation between two pint in slab like joint of cracks caused by non- uniform consolidation of the pavement layer material, these settlement may happen due to loss of fines, swelling soil or forest action, and this type measured and recorded as one slab with three levels of severity as shown in Table 9.

Table 9 Faulting or Settlement Measurement Criteria (ASTM D 5340)

Number	Severity	Runways and high speed exit taxiway	Taxiway and aprons
1	Low	Less than 6 mm	3 to 13 mm
2	Medium	6 to 13 mm	13 to 25 mm
3	High	More than 13 mm	More than 25 mm

Appendix B

Input Data of Condition Survey

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		**Inspector Name**			
From	**Runway 0+000**	**Branch Use**	**S RWY**	**Date Inspected**	**18.04.2017**
To	**Runway 3+660**	**Section Width**	**60**	**Section Length**	**3660**

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 7 — Sample Area 600

Distress Code	L	M	H
47	25	25	
48	30	24	
41	6		
48	24		
51	30		

Sketch / comment

Sample Number 30 — Sample Area 600

Distress Code	L	M	H
48	90	30	
52	30	30	
43	40		
41	60		

Sample Number 53 — Sample Area 600

Distress Code	L	M	H
47	70		
48	30	30	15
50	90		
52	80	60	

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Runway 0+000	Branch Use	S RWY	Date Inspected	26.04.2017
To	Runway 3+660	Section Width	60	Section Length	3660

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 76, Sample Area 600

Distress Code	L	M	H
41	3	5	40
47		20	
48	20	20	
43	1	140	
49	10		
50	40		

Sketch / comment

Sample Number 99, Sample Area 600

Distress Code	L	M	H
41	10	5	
43	10	20	
47	30	30	
48	45	60	
52	25	190	
53	2	2	

Sample Number 122, Sample Area 600

Distress Code	L	M	H
41	20	30	
47	20	50	
48	30	40	10
43	70	70	
52	10	20	
53	3	10	

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Runway 0+000	Branch Use	S RWY	Date Inspected	01.05.2017
To	Runway 3+660	Section Width	60	Section Length	3660

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 145 — Sample Area 600

Distress Code	L	M	H
47	20	40	20
48	30	20	
43	20	40	20
52	35	35	

Sketch / comment

Sample Number 168 — Sample Area 600

Distress Code	L	M	H
47	30	30	20
48	30	20	10
52	40	20	
43	30		
53	5		

Sample Number 191 — Sample Area 600

Distress Code	L	M	H
47	50	30	20
48	50	30	10
43	20	10	
53	5	3	
52	50	30	
41	10		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Runway 0+000	Branch Use	S RWY	Date Inspected	07.05.2017
To	Runway 3+660	Section Width	60	Section Length	3660

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 214 — Sample Area 600

Distress Code	L	M	H
47	50	30	20
48	50	20	
43	20	10	
52	15	15	
57	10	5	
41	5	5	

Sketch / comment

Sample Number 237 — Sample Area 600

Distress Code	L	M	H
47	50	30	
48	30	20	
43	15	30	
52	20	10	20
41	20	5	
53	5	15	

Sample Number 260 — Sample Area 600

Distress Code	L	M	H
48	50	20	
47	40	10	10
52	100		
57	15		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Runway 0+000	Branch Use	S RWY	Date Inspected	07.05.2017
To	Runway 3+660	Section Width	60	Section Length	3660

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 283, Sample Area 600

Distress Code	L	M	H
47	100	10	
48	30	30	
52	20	20	
41	5	10	
53	5		

Sketch / comment

Sample Number 306, Sample Area 600

Distress Code	L	M	H
47	100		
48	20	10	
52	20		
53	5		

Sample Number 329, Sample Area 600

Distress Code	L	M	H
47	40	20	
48	20	10	
41	30		
52	20		
57	10		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		**Inspector Name**			
From	**Runway 0+000**	**Branch Use**	**S RWY**	**Date Inspected**	**07.05.2017**
To	**Runway 3+660**	**Section Width**	**60**	**Section Length**	**3660**

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number	352	Sample Area	600
Distress Code	**L**	**M**	**H**
47	**50**	**20**	**10**
48	**10**	**20**	
41	**5**	**5**	

Sketch / comment

Sample Number		Sample Area	600
Distress Code	**L**	**M**	**H**

Sample Number		Sample Area	600
Distress Code	**L**	**M**	**H**

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Alpha 0+000	Branch Use	A TWY	Date Inspected	22.06.2017
To	Alpha 4+145	Section Width	35	Section Length	4145

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 8, Sample Area 514.5

Distress Code	L	M	H
41	5	10	
43	5		
47	15		
48	15	15	
52	20	20	
53	5		

Sketch / comment

Sample Number 26, Sample Area 514.5

Distress Code	L	M	H
47	15	10	
48	15	15	
52	40	40	45
53	3		
50	60		

Sample Number 44, Sample Area 514.5

Distress Code	L	M	H
47	30	15	
48	15	30	
52	60	60	
57	20		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Alpha 0+000	Branch Use	A TWY	Date Inspected	22.06.2017
To	Alpha 4+145	Section Width	35	Section Length	4145

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 62 Sample Area 514.5

Sketch / comment

Distress Code	L	M	H
41	10	5	
43	5		
48	15	30	
52	60	30	
53	5		

Sample Number 80 Sample Area 514.5

Distress Code	L	M	H
47	15	15	
48	30	15	
52	45	45	
57	15	30	

Sample Number 98 Sample Area 514.5

Distress Code	L	M	H
41	5	10	
47	15	30	
48	30		
52	60		
53	5		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		**Inspector Name**			
From	**Alpha 0+000**	**Branch Use**	**A TWY**	**Date Inspected**	**10.05.2017**
To	**Alpha 4+145**	**Section Width**	**35**	**Section Length**	**4145**

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 116, Sample Area 514.5

Distress Code	L	M	H
47	14.7	15	
48	14.7		
41	10	140	
53	15	5	
52	20		

Sketch / comment

Sample Number 134, Sample Area 514.5

Distress Code	L	M	H
48	14.7	14.7	15
41	10	10	
53	10		
52	20	10	
43	5		

Sample Number 152, Sample Area 514.5

Distress Code	L	M	H
48	14.7	14.7	
47	14.7		10
52	10	30	
41	10	5	
57	20	20	

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		**Inspector Name**			
From	**Alpha 0+000**	**Branch Use**	**A TWY**	**Date Inspected**	**10.05.2017**
To	**Alpha 4+145**	**Section Width**	**35**	**Section Length**	**4145**

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 170 Sample Area 514.5

Distress Code	L	M	H
48	10	20	
41	10		
53	5		
52	20	20	
57	20		
49	2		

Sketch / comment

Sample Number 188 Sample Area 514.5

Distress Code	L	M	H
47	29		
48	14.7	14.7	
53	5	7	8
52	50		
41	10		
49	10		

Sample Number 206 Sample Area 514.5

Distress Code	L	M	H
47	14.7	14.7	14.7
48		14.7	14.7
52	10		75
53		10	10
41	10		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Alpha 0+000	Branch Use	A TWY	Date Inspected	10.05.2017
To	Alpha 4+145	Section Width	35	Section Length	4145

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 224 — Sample Area 514.5

Distress Code	L	M	H
47	29		
48	14.7	14.7	
42	2		
53	5	5	
52		10	20
41	10		

Sketch / comment

Sample Number 242 — Sample Area 514.5

Distress Code	L	M	H
48	14.7	14.7	
47	14.7	14.7	
52	30	20	
57	10		

Sample Number 260 — Sample Area 514.5

Distress Code	L	M	H
47	14.7	14.7	
48	29	10	
57	15		
53	10		
52	10		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Alpha 0+000	Branch Use	A TWY	Date Inspected	10.05.2017
To	Alpha 4+145	Section Width	35	Section Length	4145

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 278 — Sample Area 514.5

Distress Code	L	M	H
48	14.7	14.7	
47	14.7	10	
52			60
57		60	
41	5		

Sketch / comment

Sample Number 264 — Sample Area 514.5

Distress Code	L	M	H
47	10	20	
48	20	10	
52	45	30	20
53	5	20	

Sample Number 280 — Sample Area 514.5

Distress Code	L	M	H
47	30	20	
48	30	10	
52	20	10	20
53	5	10	
41	5	10	

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Bravo 0+000	Branch Use		Date Inspected	01.05.2017
To	Bravo 0+252	Section Width	35	Section Length	252.35

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 1, Sample Area 514.5

Distress Code	L	M	H
47	14.7	14.7	
48	14.7	14.7	14.7
52	70		
53	2		
41	5		

Sketch / comment

Sample Number 3, Sample Area 514.5

Distress Code	L	M	H
48	14.7	11	
47	14.7	14.7	
52	70	28	

Sample Number 5, Sample Area 514.5

Distress Code	L	M	H
47		14.7	
48	14.7	10	
52	10	10	

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Bravo 0+000	Branch Use		Date Inspected	01.05.2017
To	Bravo 0+252	Section Width	35	Section Length	252.35

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sketch / comment

Sample Number	7	Sample Area	514.5
Distress Code	**L**	**M**	**H**
48	14.7		14.7
47	14.7		
52	70		
53	2		

Sample Number	9	Sample Area	514.5
Distress Code	**L**	**M**	**H**
48	14.7	14.7	
47	14.7		
52	70		
43	5		

Sample Number	11	Sample Area	514.5
Distress Code	**L**	**M**	**H**
48	14.7		
47	14.7		
52	50		
41	3		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Bravo 0+000	Branch Use		Date Inspected	01.05.2017
To	Bravo 0+252	Section Width	35	Section Length	252.35

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 13, Sample Area 514.5

Distress Code	L	M	H
47	14.7	5	
48	14.7		
41	5	12	
52	70		
57	10		

Sketch / comment

Sample Number 15, Sample Area 514.5

Distress Code	L	M	H
41	20	30	
52	50	20	
48	20	1	

Sample Number 17, Sample Area 600

Distress Code	L	M	H
47		89	60
48	5	10	
52	10	50	80
53	5	10	

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Charli 0+000	Branch Use		Date Inspected	25.04.2017
To	Charli 0+500	Section Width	35	Section Length	645

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 5 Sample Area 525

Distress Code	L	M	H
47	105		
52	60	60	60
41	40	40	
53	2	2	

Sketch / comment

Sample Number 8 Sample Area 525

Distress Code	L	M	H
47	45	45	
48	4		
52	15	45	60
41	5	10	

Sample Number 11 Sample Area 525

Distress Code	L	M	H
47	45	45	15
52	45	15	30
41	4		
53	2		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name	
From	Charli 0+000	Branch Use		Date Inspected	25.04.2017
To	Charli 0+500	Section Width	35	Section Length	645

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 14 — Sample Area 525

Distress Code	L	M	H
47	45	45	
48	30	30	
50	1		
53		2	
41	12	4	

Sketch / comment

Sample Number 17 — Sample Area 525

Distress Code	L	M	H
47		45	
48	90		
53	43		22.5
41	4	5	

Sample Number 20 — Sample Area 525

Distress Code	L	M	H
48	90		
47	15	30	
41	5	45	
52	10	25	

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		**Inspector Name**			
From	**Charli 0+000**	**Branch Use**		**Date Inspected**	**25.04.2017**
To	**Charli 0+500**	**Section Width**	**35**	**Section Length**	**645**

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sketch / comment

Sample Number	23	Sample Area	525
Distress Code	**L**	**M**	**H**
47		**45**	
48	**60**		
41	**5**	**10**	
52	**15**	**60**	**5**

Sample Number	26	Sample Area	525
Distress Code	**L**	**M**	**H**
47	**15**	**30**	
48	**30**	**60**	
41	**15**	**20**	
52	**10**	**15**	**45**

Sample Number	38	Sample Area	525
Distress Code	**L**	**M**	**H**
48	**30**	**35**	
52	**30**		
41	**5**	**10**	

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Charli 0+000	Branch Use		Date Inspected	25.04.2017
To	Charli 0+500	Section Width	35	Section Length	645

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 29 Sample Area 525

Distress Code	L	M	H
48	30		
41	10		
52	3	5	
53	2		

Sketch / comment

Sample Number 32 Sample Area 525

Distress Code	L	M	H
52	8	2	
41	4		

Sample Number 35 Sample Area 525

Distress Code	L	M	H
48	10	5	
52	5		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Delta 0+000	Branch Use		Date Inspected	25.04.2017
To	Delta 0+505	Section Width	35	Section Length	645

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 6 Sample Area 525

Distress Code	L	M	H
48	9	18	
52	60	45	45
41	10	15	
50	72		
47		9	18

Sketch / comment

Sample Number 9 Sample Area 525

Distress Code	L	M	H
53	20	10	
50	315		
52	50	75	
48	15		
47	15	15	
41	10		

Sample Number 12 Sample Area 525

Distress Code	L	M	H
48	45		
50	72		
47	15	15	
52	45	15	
41	10		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Delta 0+000	Branch Use		Date Inspected	25.04.2017
To	Delta 0+505	Section Width	35	Section Length	645

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 15 — Sample Area 525

Distress Code	L	M	H
50	72		
48	15	15	
47	15		15
52	8	30	15
41	5	5	

Sketch / comment

Sample Number 18 — Sample Area 525

Distress Code	L	M	H
51	10		
50	72		
47	15		
48	15	15	
52	30	15	
41	5	10	

Sample Number 21 — Sample Area 525

Distress Code	L	M	H
50	72		
48	30	15	
47	15		
52	30		
41	10		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Delta 0+000	Branch Use		Date Inspected	25.04.2017
To	Delta 0+505	Section Width	35	Section Length	645

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 24 Sample Area 525

Distress Code	L	M	H
50	72		
48		15	
52	15	15	
47	15		

Sketch / comment

Sample Number 27 Sample Area 525

Distress Code	L	M	H
57	10		
47		30	
48	30	10	
53	10	10	10
41	10	5	3
52	45	30	45

Sample Number 30 Sample Area 525

Distress Code	L	M	H
41	11	25	
47	5	5	
48	10	10	
52	120		
53	15	20	5

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Delta 0+000	Branch Use		Date Inspected	26.04.2017
To	Delta 0+505	Section Width	35	Section Length	645

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 33 Sample Area 525

Distress Code	L	M	H
41	35	30	
48	10	10	
52	20	20	
53	10	5	

Sketch / comment

Sample Number 36 Sample Area 525

Distress Code	L	M	H
48	10	20	15
52	20	10	
41	10	10	
53	5	6	

Sample Number 39 Sample Area 525

Distress Code	L	M	H
48	10	20	
52	30		
53	10	10	

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Hotel 0+000	Branch Use	H TWY	Date Inspected	16.07.2017
To	Hotel 4+145	Section Width	35	Section Length	4145

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number: 3 Sample Area: 514.5

Distress Code	L	M	H
48	5	10	
51	10		
52	10		

Sketch / comment

Sample Number: 21 Sample Area: 514.5

Distress Code	L	M	H
48	2		

Sample Number: 39 Sample Area: 514.5

Distress Code	L	M	H
48	10	10	
50	3		
52	10	10	

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Hotel 0+000	Branch Use	H TWY	Date Inspected	16.07.2017
To	Hotel 4+145	Section Width	35	Section Length	4145

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 57 Sample Area 514.5

Distress Code	L	M	H
48	10	10	
57	10		

Sketch / comment

Sample Number 75 Sample Area 514.5

Distress Code	L	M	H
48	5		

Sample Number 93 Sample Area 514.5

Distress Code	L	M	H
43	5		
48	5	10	

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET			
PID		Inspector Name	
From	Hotel 0+000	Branch Use H TWY	Date Inspected 16.07.2017
To	Hotel 4+145	Section Width 35	Section Length 4145

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 111 — Sample Area 514.5

Sketch / comment

Distress Code	L	M	H
48	3	5	
42	2		

Sample Number 129 — Sample Area 514.5

Distress Code	L	M	H
43	5	2	
48	5	5	
52	10	5	

Sample Number 147 — Sample Area 514.5

Distress Code	L	M	H
48	10	10	
52	5	10	
57	10		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET					
PID		Inspector Name			
From	Hotel 0+000	Branch Use	H TWY	Date Inspected	16.07.2017
To	Hotel 4+145	Section Width	35	Section Length	4145

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number	165	Sample Area	514.5
Distress Code	L	M	H
48	15	5	
43	5		
52	5		

Sketch / comment

Sample Number	183	Sample Area	514.5
Distress Code	L	M	H
43	2		
48	5	10	
52	5		
57		10	

Sample Number	201	Sample Area	514.5
Distress Code	L	M	H
43	5		
48	10	10	
52	10	10	
57	5		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		**Inspector Name**			
From	**Hotel 0+000**	**Branch Use**	**H TWY**	**Date Inspected**	**16.07.2017**
To	**Hotel 4+145**	**Section Width**	**35**	**Section Length**	**4145**

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number	219	Sample Area	514.5
Distress Code	**L**	**M**	**H**
48	**5**		

Sketch / comment

Sample Number	237	Sample Area	514.5
Distress Code	**L**	**M**	**H**
43	**5**		
48	**10**	**10**	
52	**10**	**10**	

Sample Number	255	Sample Area	514.5
Distress Code	**L**	**M**	**H**
43	**5**		
48	**15**	**5**	
57	**10**	**10**	

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET			
PID		Inspector Name	
From	Hotel 0+000	Branch Use H TWY	Date Inspected 16.07.2017
To	Hotel 4+145	Section Width 35	Section Length 4145

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 273, Sample Area 514.5

Distress Code	L	M	H
48	5		

Sketch / comment

Sample Number 259, Sample Area 514.5

Distress Code	L	M	H
48	5		

Sample Number 280, Sample Area 514.5

Distress Code	L	M	H
43	5		
48	10	10	
52	10	15	
57	5	10	

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET					
PID		Inspector Name			
From	Kilo 0+000	Branch Use	Kilo	Date Inspected	22.07.2017
To	Kilo 0+505	Section Width	35	Section Length	645

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sketch / comment

Sample Number	7	Sample Area	525
Distress Code	L	M	H
48	15	15	
51	20		
57	10	5	

Sample Number	10	Sample Area	525
Distress Code	L	M	H
42	4		
48	10	10	
52	20	10	

Sample Number	13	Sample Area	525
Distress Code	L	M	H
48	15	15	
52	10	10	

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Kilo 0+000	Branch Use	Kilo	Date Inspected	22.07.2017
To	Kilo 0+505	Section Width	35	Section Length	645

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 16, Sample Area 525

Distress Code	L	M	H
48	20	20	
52	10	5	
57			5

Sketch / comment

Sample Number 19, Sample Area 525

Distress Code	L	M	H
41		5	
43		5	10
48		15	15

Sample Number 22, Sample Area 525

Distress Code	L	M	H
48	15		15
52	20	10	

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		**Inspector Name**			
From	**Kilo 0+000**	**Branch Use**	**Kilo**	**Date Inspected**	**22.07.2017**
To	**Kilo 0+505**	**Section Width**	**35**	**Section Length**	**645**

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 25 — Sample Area 525

Distress Code	L	M	H
48	20	20	
52	10		
57		10	5

Sketch / comment

Sample Number 28 — Sample Area 525

Distress Code	L	M	H
48	15	15	
52	20		
51		20	

Sample Number 31 — Sample Area 525

Distress Code	L	M	H
48	20	10	
52	30		
53	5		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET					
PID		Inspector Name			
From	Kilo 0+000	Branch Use	Kilo	Date Inspected	22.07.2017
To	Kilo 0+505	Section Width	35	Section Length	645

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 34 Sample Area 525

Distress Code	L	M	H
41	5		
43	5		10
48	15		10
50	2		

Sketch / comment

Sample Number 37 Sample Area 525

Distress Code	L	M	H
48	10	10	10
52	20	10	

Sample Number 40 Sample Area 525

Distress Code	L	M	H
48	15	15	
52	10		10
57		20	

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		**Inspector Name**			
From	**Juliet 0+000**	**Branch Use**	**J TWY**	**Date Inspected**	**30.07.2017**
To	**Juliet 0+060**	**Section Width**	**12**	**Section Length**	**20**

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number	1	Sample Area	240
Distress Code	**L**	**M**	**H**
48	**5**	**5**	

Sketch / comment

Sample Number	3	Sample Area	240
Distress Code	**L**	**M**	**H**
48	**10**		
52	**3**		

Sample Number	5	Sample Area	240
Distress Code	**L**	**M**	**H**
48	**7**		
49	**3**		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Juliet 0+000	Branch Use	J TWY	Date Inspected	30.07.2017
To	Juliet 0+060	Section Width	12	Section Length	20

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number	7	Sample Area	240
Distress Code	**L**	**M**	**H**
48	8		
45	4		

Sketch / comment

Sample Number	9	Sample Area	240
Distress Code	**L**	**M**	**H**
48	10		
49	3		

Sample Number	11	Sample Area	240
Distress Code	**L**	**M**	**H**
48	10		
52	5		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		**Inspector Name**			
From	**Juliet 0+000**	**Branch Use**	**J TWY**	**Date Inspected**	**30.07.2017**
To	**Juliet 0+060**	**Section Width**	**12**	**Section Length**	**20**

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number	13	Sample Area	240
Distress Code	**L**	**M**	**H**
48	**8**		
52	**10**		
57	**4**		

Sketch / comment

Sample Number	14	Sample Area	240
Distress Code	**L**	**M**	**H**
48	**7**		
52	**10**		
57	**5**		

Sample Number		Sample Area	
Distress Code	**L**	**M**	**H**

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	LIMA 0+000	Branch Use	LIMA	Date Inspected	19.07.2017
To	LIMA 0+500	Section Width	35	Section Length	645

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 4 — Sample Area 525

Distress Code	L	M	H
43	5		
48	15	15	

Sketch / comment

Sample Number 7 — Sample Area 525

Distress Code	L	M	H
41		5	
47	10	15	
52	10		

Sample Number 10 — Sample Area 525

Distress Code	L	M	H
48	15	10	
50	3		
51	10		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	LIMA 0+000	Branch Use	LIMA	Date Inspected	19.07.2017
To	LIMA 0+500	Section Width	35	Section Length	645

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 13 — Sample Area 525

Distress Code	L	M	H
48	15	15	
52	10	10	

Sketch / comment

Sample Number 16 — Sample Area 525

Distress Code	L	M	H
48	10	10	5
51	10		
57	10		

Sample Number 19 — Sample Area 525

Distress Code	L	M	H
48	15	15	
52	15	10	
53	2		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET					
PID		Inspector Name			
From	LIMA 0+000	Branch Use	LIMA	Date Inspected	19.07.2017
To	LIMA 0+500	Section Width	35	Section Length	645

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number	22	Sample Area	525
Distress Code	**L**	**M**	**H**
41	**4**		
43	**5**		
48	**10**	**15**	

Sketch / comment

Sample Number	25	Sample Area	525
Distress Code	**L**	**M**	**H**
48	**20**	**10**	
52	**20**		

Sample Number	28	Sample Area	525
Distress Code	**L**	**M**	**H**
48	**10**	**10**	**5**
51	**20**		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	LIMA 0+000	Branch Use	LIMA	Date Inspected	19.07.2017
To	LIMA 0+500	Section Width	35	Section Length	645

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number	31	Sample Area	525
Distress Code	L	M	H
41	5		
42	2		
43	10		
53	5		

Sketch / comment

Sample Number	34	Sample Area	525
Distress Code	L	M	H
48	5	15	
52	10	10	
51	10		

Sample Number	37	Sample Area	525
Distress Code	L	M	H
48	15	10	5
52	15	15	
57	10		10

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Mike 0+000	Branch Use	Mike	Date Inspected	18.07.2017
To	Mike 0+252	Section Width	35	Section Length	252.35

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 1 Sample Area 514.5

Distress Code	L	M	H
41	2		
43		5	
48	10	10	

Sketch / comment

Sample Number 3 Sample Area 514.5

Distress Code	L	M	H
43	5		
48	5	15	
52	10	15	

Sample Number 5 Sample Area 514.5

Distress Code	L	M	H
48	15	10	
52	10	10	

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET					
PID		Inspector Name			
From	Mike 0+000	Branch Use	Mike	Date Inspected	18.07.2017
To	Mike 0+252	Section Width	35	Section Length	252.35

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number	7	Sample Area	514.5
Distress Code	L	M	H
43	5		
48	10	5	
52	20	5	
53	2		

Sketch / comment

Sample Number	9	Sample Area	514.5
Distress Code	L	M	H
48	10	10	
52	5	15	
57	10	10	

Sample Number	11	Sample Area	514.5
Distress Code	L	M	H
41	5		
43	10		
48	15	10	

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		**Inspector Name**			
From	**Mike 0+000**	**Branch Use**	**Mike**	**Date Inspected**	**18.07.2017**
To	**Mike 0+252**	**Section Width**	**35**	**Section Length**	**252.35**

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 13 — Sample Area 514.5

Distress Code	L	M	H
48	15	10	
52	10	15	
50	3		

Sketch / comment

Sample Number 15 — Sample Area 514.5

Distress Code	L	M	H
41	5		
48	10	10	
57	10	5	

Sample Number 17 — Sample Area 600

Distress Code	L	M	H
41	3		
43	5		
48	15	10	
52	10	10	

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Hotel Apron 0+000	Branch Use	H Apron	Date Inspected	26.07.2017
To	Hotel Apron 0+350	Section Width	125	Section Length	350

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 1, Sample Area 625

Distress Code	L	M	H
48	38	50	20
45	10	10	
52	20	10	
57	10	20	

Sketch / comment

Sample Number 6, Sample Area 625

Distress Code	L	M	H
48	25	50	30
52	20	20	
45	20		10

Sample Number 11, Sample Area 625

Distress Code	L	M	H
48	15	10	25
52	20	20	
50	50	50	

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Hotel Apron 0+000	Branch Use	H Apron	Date Inspected	26.07.2017
To	Hotel Apron 0+350	Section Width	125	Section Length	350

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 16 — Sample Area 625

Distress Code	L	M	H
48	40	20	25
50	125		
52	20	20	
45	10	10	
57	20		

Sketch / comment

Sample Number 21 — Sample Area 625

Distress Code	L	M	H
41	5	10	
43	10	10	
48	30	50	
52	20		
53	10		

Sample Number 26 — Sample Area 625

Distress Code	L	M	H
48	25	50	25
52	20		20
57		50	
45	10		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		**Inspector Name**			
From	**Hotel Apron 0+000**	**Branch Use**	**H Apron**	**Date Inspected**	**26.07.2017**
To	**Hotel Apron 0+350**	**Section Width**	**125**	**Section Length**	**350**

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 31 — Sample Area 625

Distress Code	L	M	H
41	20	20	
43		25	
48	25	50	
52	50		
45	20	20	

Sketch / comment

Sample Number 36 — Sample Area 625

Distress Code	L	M	H
48	25	30	25
45	10	10	
52	30	30	
57	20		

Sample Number 41 — Sample Area 625

Distress Code	L	M	H
48	25	25	25
43	10	10	
52	50	20	
41	20	50	

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET			
PID		Inspector Name	
From	Hotel Apron 0+000	Branch Use: H Apron	Date Inspected: 27.07.2017
To	Hotel Apron 0+350	Section Width: 125	Section Length: 350

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 46, Sample Area 625

Distress Code	L	M	H
43	10	20	
48	25	75	25
49	30		
50	2		
45	5		5
51	50		

Sketch / comment

Sample Number 51, Sample Area 625

Distress Code	L	M	H
41	10	10	
43	20	10	
48	25	50	25
49	30		
52	20	20	
45	10	10	

Sample Number 56, Sample Area 625

Distress Code	L	M	H
48	25	50	25
45	10		
52	50	10	
57	20	25	
53	10		
41	15		

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Hotel Apron 0+000	Branch Use	H Apron	Date Inspected	27.07.2017
To	Hotel Apron 0+350	Section Width	125	Section Length	350

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number	61	Sample Area	625
Distress Code	**L**	**M**	**H**
43	**15**		
45	**5**	**5**	
48	**25**	**25**	**25**
52	**30**	**30**	

Sketch / comment

Sample Number		Sample Area	
Distress Code	**L**	**M**	**H**

Sample Number		Sample Area	
Distress Code	**L**	**M**	**H**

AIRFIELD ASPHALT PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	Hotel Apron 0+000	Branch Use	H Apron	Date Inspected	26.07.2017
To	Hotel Apron 0+350	Section Width	125	Section Length	350

AC Surfaced Distress Codes

41. Alligator Cracking	46. Jet Blast	51.Polished aggregate	56.Swell
42. Bleeding	47. Jt. Reflection (PCC)	52. Raveling	57.weather
43. Block cracking	48.L&T cracking	53. Rutting	
44. Corrugation	49. Oil Spillage	54.shoing from PCC	
45. Depression	50.Patching	55.Slippage Cracking	

Sample Number 49 — Sample Area 625

Distress Code	L	M	H
48	25	50	25
52	20	30	
45	10		
51		20	

Sketch / comment

Sample Number 53 — Sample Area 625

Distress Code	L	M	H
43	10	10	
45	10		
48	25	50	
52	50		

Sample Number 57 — Sample Area 625

Distress Code	L	M	H
48	50	75	50
52	50		
57	20	50	
45	10	10	

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	0+000 Eco TWY	Branch Use	E TWY	Date Inspected	05.08.2017
To	0+060 Eco TWY	Section Width	45	Section Length	90
Slab Width 7.5 m	Slab Length 7.5 m	Number of Slab	18		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 1, Sample Area 1012.5

Distress Code	L	M	H
62		1	2
63	1	2	6
65			9
67	3	1	5
71	1		4
72			2

Sketch / comment

Sample Number 2, Sample Area 1012.5

Distress Code	L	M	H
63	1	1	5
64	1	1	2
67	1	2	3
65		2	3
71		1	1
72			5

Sample Number 3, Sample Area 1012.5

Distress Code	L	M	H
63		2	5
64		1	1
65	1	2	4
67		2	2
71		1	2
72			3

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name	
From	0+000 Eco TWY	Branch Use	E TWY
		Date Inspected	05.08.2017
To	0+060 Eco TWY	Section Width	45
		Section Length	90
Slab Width	7.5 m	Slab Length	7.5 m
Number of Slab	18		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number: 4 Sample Area: 1012.5

Distress Code	L	M	H
62		3	2
63		1	3
65	4	2	1
67	3	2	1
71	1		1
72			3

Sketch / comment

Sample Number Sample Area

Distress Code	L	M	H

Sample Number Sample Area

Distress Code	L	M	H

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name	
From	0+000 FOX TWY	Branch Use	F TWY	Date Inspected	29.07.2017
To	0+810 FOX TWY	Section Width	30	Section Length	990
Slab Width 7.5 m	Slab Length 7.5 m	Number of Slab	16

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 1, Sample Area 900

Distress Code	L	M	H
62		1	1
63		2	3
65		4	2
67		2	1
72			2

Sketch / comment

Sample Number 3, Sample Area 900

Distress Code	L	M	H
62		2	1
63	1		3
65		3	2
66		1	
71		1	1
72			2

Sample Number 5, Sample Area 900

Distress Code	L	M	H
62		1	
63		2	2
65	1	2	3
67		2	
71	1	1	
74	1	2	

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name	
From	0+000 FOX TWY	Branch Use: F TWY	Date Inspected: 29.07.2017
To	0+810 FOX TWY	Section Width: 30	Section Length: 990
Slab Width: 7.5 m	Slab Length: 7.5 m	Number of Slab	16

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number: 7 — Sample Area: 900

Distress Code	L	M	H
62			1
63			4
65		2	2
67		1	
71	1		2
72			1

Sketch / comment

Sample Number: 9 — Sample Area: 900

Distress Code	L	M	H
62		1	
63			3
65			5
67		1	
71	1	1	

Sample Number: 11 — Sample Area: 900

Distress Code	L	M	H
61			1
63	1		4
65		3	1
71	2	1	
72		2	

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name	
From	0+000 FOX TWY	Branch Use: F TWY	Date Inspected: 29.07.2017
To	0+810 FOX TWY	Section Width: 30	Section Length: 990
Slab Width: 7.5 m	Slab Length: 7.5 m	Number of Slab	16

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number: 13 Sample Area: 900

Distress Code	L	M	H
62			1
63			5
65		3	2
67		2	
71		1	1
72			4

Sketch / comment

Sample Number: 15 Sample Area: 900

Distress Code	L	M	H
62			2
63			5
65	1		4
71		2	

Sample Number: 17 Sample Area: 900

Distress Code	L	M	H
62			2
63		2	4
65		4	2
67		2	1
71		1	2
72			4

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET							
PID				Inspector Name			
From	0+000 FOX TWY			Branch Use	F TWY	Date Inspected	29.07.2017
To	0+810 FOX TWY			Section Width	30	Section Length	990
Slab Width	7.5 m	Slab Length	7.5 m	Number of Slab	16		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sketch / comment

Sample Number	19	Sample Area	900
Distress Code	L	M	H
62	1	2	
63		3	5
65		4	2
67		1	2
71		2	1
72			3

Sample Number	21	Sample Area	900
Distress Code	L	M	H
62			2
63		2	1
65		4	3
66	2		
71		3	1
72			1

Sample Number	23	Sample Area	900
Distress Code	L	M	H
62		1	2
63		2	
65		3	1
66		2	
71	1	2	

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET			
PID		Inspector Name	
From	0+000 FOX TWY	Branch Use	F TWY	Date Inspected	29.07.2017
To	0+810 FOX TWY	Section Width	30	Section Length	990
Slab Width	7.5 m	Slab Length	7.5 m	Number of Slab	16

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 25 Sample Area 900

Distress Code	L	M	H
62			2
63		2	3
65		2	4
71	1		2
72			1

Sketch / comment

Sample Number 27 Sample Area 900

Distress Code	L	M	H
62			1
63		1	1
65	4	2	
72			9
67	1		

Sample Number 29 Sample Area 900

Distress Code	L	M	H
62		1	2
63		4	1
65		4	
67			2
72			2

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		**Inspector Name**	
From	**0+000 FOX TWY**	**Branch Use** **F TWY**	**Date Inspected** **29.07.2017**
To	**0+810 FOX TWY**	**Section Width** **30**	**Section Length** **990**
Slab Width **7.5 m**	**Slab Length** **7.5 m**	**Number of Slab**	**16**

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sketch / comment

Sample Number	31	Sample Area	900
Distress Code	**L**	**M**	**H**
62		**1**	**1**
63		**2**	**1**
65		**2**	**4**
66		**1**	**1**
72			**3**
71			**2**

Sample Number	33	Sample Area	900
Distress Code	**L**	**M**	**H**
62	**1**	**1**	**1**
63		**2**	**2**
65		**3**	**2**
67			**2**
71		**1**	**1**
72			**2**

Sample Number		Sample Area	
Distress Code	**L**	**M**	**H**

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET					
PID		Inspector Name			
From	0+000 Golf TWY	Branch Use	G TWY	Date Inspected	01.08.2017
To	0+810 Golf TWY	Section Width	30	Section Length	990
Slab Width 7.5 m	Slab Length 7.5 m	Number of Slab	16		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sketch / comment

Sample Number 1, Sample Area 900

Distress Code	L	M	H
67	1	1	2
73	2		
63	1	2	4
71	1		
74	1	1	
72	2		

Sample Number 3, Sample Area 900

Distress Code	L	M	H
63		1	3
64			2
67			4
71		1	
72	5		
65	2	2	1

Sample Number 5, Sample Area 900

Distress Code	L	M	H
63		2	8
64		2	
67	2	1	
72			5
73	2		

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name	
From	0+000 Golf TWY	Branch Use	G TWY
		Date Inspected	01.08.2017
To	0+810 Golf TWY	Section Width	30
		Section Length	990
Slab Width	7.5 m	Slab Length	7.5 m
Number of Slab	16		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 7 — Sample Area 900

Distress Code	L	M	H
63	1		6
64		2	
65	2	2	
71	1		
72			3

Sketch / comment

Sample Number 9 — Sample Area 900

Distress Code	L	M	H
62	1		1
63		1	5
65		4	2
67			3
72			2
73	2		

Sample Number 11 — Sample Area 900

Distress Code	L	M	H
63		2	2
64		1	3
65		1	4
67		1	2
71	1	1	1
72			3

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name	
From	0+000 Golf TWY	Branch Use	G TWY	Date Inspected	01.08.2017
To	0+810 Golf TWY	Section Width	30	Section Length	990
Slab Width	7.5 m	Slab Length	7.5 m	Number of Slab	16

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 13, Sample Area 900

Distress Code	L	M	H
63		2	4
64		2	2
66		1	
67	1		1
71		2	
75			2

Sketch / comment

Sample Number 15, Sample Area 900

Distress Code	L	M	H
62		1	2
63		1	3
65		2	4
67		1	3
71		2	1
72			3

Sample Number 17, Sample Area 900

Distress Code	L	M	H
63		1	3
65	1	2	2
67		2	3
71		2	1
72			3
73			2

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	0+000 Golf TWY	Branch Use	G TWY	Date Inspected	01.08.2017
To	0+810 Golf TWY	Section Width	30	Section Length	990
Slab Width 7.5 m	Slab Length 7.5 m	Number of Slab	16		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 19 Sample Area 900

Distress Code	L	M	H
63		1	4
64		2	1
65	1		3
67			2
72			6
73	2		

Sketch / comment

Sample Number 21 Sample Area 900

Distress Code	L	M	H
62	1		1
63			3
64		2	
67		2	
72			5

Sample Number 23 Sample Area 900

Distress Code	L	M	H
62			1
63		1	4
65	2		2
67		2	1
72			6
74		2	

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	0+000 Golf TWY	Branch Use	G TWY	Date Inspected	01.08.2017
To	0+810 Golf TWY	Section Width	30	Section Length	990
Slab Width 7.5 m	Slab Length 7.5 m	Number of Slab	16		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 25, Sample Area 900

Distress Code	L	M	H
63		1	4
64		2	1
65	1		3
67			2
72			6
74	1		1

Sketch / comment

Sample Number 27, Sample Area 900

Distress Code	L	M	H
63			5
66		2	
71		2	1
72			3
73		3	
65	2		1

Sample Number 29, Sample Area 900

Distress Code	L	M	H
62			1
63		1	4
64		1	2
71	1	1	
72			6
73	2		

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET			
PID		Inspector Name	
From	0+000 Golf TWY	Branch Use	G TWY	Date Inspected	01.08.2017
To	0+810 Golf TWY	Section Width	30	Section Length	990
Slab Width	7.5 m	Slab Length	7.5 m	Number of Slab	16

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 31 — Sample Area 900

Distress Code	L	M	H
67	1	1	2
73		2	
63	2	1	4
71		1	
74	1	1	
72			2

Sketch / comment

Sample Number 33 — Sample Area 900

Distress Code	L	M	H
63		1	3
65	1	2	2
67		2	3
71		2	1
72			3
75			2

Sample Number — Sample Area

Distress Code	L	M	H

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name	
From	0+000 November TWY	Branch Use	N TWY
		Date Inspected	08.08.2017
To	0+240 November TWY	Section Width	30
		Section Length	240
Slab Width	7.5 m	Slab Length	7.5 m
Number of Slab	16		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 2 — Sample Area 900

Distress Code	L	M	H
63	1	1	1
73	1		

Sketch / comment

Sample Number 3 — Sample Area 900

Distress Code	L	M	H
63		1	1
73	1		

Sample Number 4 — Sample Area 450

Distress Code	L	M	H
63		1	1
73	1		
65	1		

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		**Inspector Name**	
From	**0+000 November TWY**	**Branch Use** **N TWY**	**Date Inspected** **08.08.2017**
To	**0+240 November TWY**	**Section Width** **30**	**Section Length** **240**
Slab Width **7.5 m**	**Slab Length** **7.5 m**	**Number of Slab**	**16**

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 5, Sample Area 900

Distress Code	L	M	H
62	1		
63		1	1
73	1		
65	1	1	

Sketch / comment

Sample Number 6, Sample Area 900

Distress Code	L	M	H
62		1	1
63	1	1	
65	2	1	

Sample Number 7, Sample Area 900

Distress Code	L	M	H
63		1	1
65		1	1
73	1		

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name	
From	0+000 Seira TWY	Branch Use	S TWY	Date Inspected	03.08.2017
To	0+240 Seira TWY	Section Width	30	Section Length	240
Slab Width 7.5 m	Slab Length 7.5 m	Number of Slab	16

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 2, Sample Area 900

Distress Code	L	M	H
62			2
63		3	3
64		2	1
65	2	2	1
67	1	3	3
72			1

Sketch / comment

Sample Number 3, Sample Area 900

Distress Code	L	M	H
62		2	3
63	1	1	3
64		1	
65	2	2	
67	1	2	3
72			3

Sample Number 4, Sample Area 450

Distress Code	L	M	H
62		2	1
63		3	3
67		3	5
71	1	2	2
72			3
74	1	1	1

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	0+000 Seira TWY	Branch Use	S TWY	Date Inspected	03.08.2017
To	0+240 Seira TWY	Section Width	30	Section Length	240
Slab Width 7.5 m	Slab Length 7.5 m	Number of Slab	16		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 5, Sample Area 900

Distress Code	L	M	H
62		2	2
63	1	2	1
64		1	1
67		1	5
72			2
76		1	

Sketch / comment

Sample Number 6, Sample Area 900

Distress Code	L	M	H
62		1	3
63		1	4
65		1	4
67		1	4
71		2	2
72			3

Sample Number 8, Sample Area 900

Distress Code	L	M	H
63		2	1
65	1	2	1
67	1		3
72			2
74		1	1

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name		
From	0+000 Cargo Apron	Branch Use	Cargo	Date Inspected 06.08.2017
To	0+255 Cargo Apron	Section Width	150	Section Length 264
Slab Width 7.5 m	Slab Length 7.5 m	Number of Slab	16	

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 2, Sample Area 900

Distress Code	L	M	H
62		1	1
63		3	2
64		2	
65			4
71		1	1
72			2

Sketch / comment

Sample Number 4, Sample Area 900

Distress Code	L	M	H
63		1	3
65		2	2
71		1	1
74	1	1	

Sample Number 6, Sample Area 900

Distress Code	L	M	H
62		1	
63		1	4
66		1	
65	2		2
74	2		1

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET							
PID				Inspector Name			
From	0+000 Cargo Apron			Branch Use	Cargo	Date Inspected	06.08.2017
To	0+255 Cargo Apron			Section Width	150	Section Length	264
Slab Width	7.5 m	Slab Length	7.5 m	Number of Slab	16		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sketch / comment

Sample Number	8	Sample Area	900
Distress Code	L	M	H
62		1	1
63		2	2
65	1	2	2
71	1		1
74		2	1
72			1

Sample Number	10	Sample Area	900
Distress Code	L	M	H
63		1	2
65		2	3
71		1	1
73	1	2	

Sample Number	12	Sample Area	900
Distress Code	L	M	H
63		1	3
65		2	2
73		2	
74			2
75		1	2

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	0+000 Cargo Apron	Branch Use	Cargo	Date Inspected	06.08.2017
To	0+255 Cargo Apron	Section Width	150	Section Length	264
Slab Width 7.5 m	Slab Length 7.5 m	Number of Slab	16		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 14, Sample Area 900

Distress Code	L	M	H
62			1
63		2	3
65	1	1	3
66		1	1
72			1
74		1	1

Sketch / comment

Sample Number 16, Sample Area 900

Distress Code	L	M	H
62		1	1
63		2	3
65	1	2	1
71	1		1
72			2
74		1	1

Sample Number 18, Sample Area 900

Distress Code	L	M	H
62			1
63	1	1	1
65		2	2
67		1	1
72			2
74		1	1

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	0+000 Cargo Apron	Branch Use	Cargo	Date Inspected	06.08.2017
To	0+255 Cargo Apron	Section Width	150	Section Length	264
Slab Width 7.5 m	Slab Length 7.5 m	Number of Slab	16		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 20 — Sample Area 900

Distress Code	L	M	H
63			4
65		2	2
66		1	1
71		1	1
72			4

Sketch / comment

Sample Number 22 — Sample Area 900

Distress Code	L	M	H
62			1
63			4
65		2	3
67			4
71		1	1
72			1

Sample Number 24 — Sample Area 900

Distress Code	L	M	H
62		1	1
63		1	3
65	1	2	2
67		1	1
71		1	1
72			2

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET			
PID		Inspector Name	
From	0+000 Cargo Apron	Branch Use: Cargo	Date Inspected: 06.08.2017
To	0+255 Cargo Apron	Section Width: 150	Section Length: 264
Slab Width: 7.5 m	Slab Length: 7.5 m	Number of Slab	16

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 26, Sample Area 900

Distress Code	L	M	H
62			1
63		2	2
65		1	3
67		1	
71		1	1
72			3

Sketch / comment

Sample Number 28, Sample Area 900

Distress Code	L	M	H
62		1	1
63		2	3
65		2	2
67			1
72			4
75		2	1

Sample Number 30, Sample Area 900

Distress Code	L	M	H
63	1		2
65	1	1	3
66		1	1
67			2
71		1	1
72			2

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	0+000 Cargo Apron	Branch Use	Cargo	Date Inspected	06.08.2017
To	0+255 Cargo Apron	Section Width	150	Section Length	264
Slab Width 7.5 m	Slab Length 7.5 m	Number of Slab	16		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 32 Sample Area 900

Distress Code	L	M	H
62		1	1
63		1	3
65		2	2
71		1	1
72			4

Sketch / comment

Sample Number 34 Sample Area 900

Distress Code	L	M	H
62		2	1
63		1	2
65			3
71			1
72			3
75		1	1

Sample Number 36 Sample Area 900

Distress Code	L	M	H
62		1	1
63		3	2
65		3	3
71		1	1
72			3
74			1

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	0+000 Cargo Apron	Branch Use	Cargo	Date Inspected	06.08.2017
To	0+255 Cargo Apron	Section Width	150	Section Length	264

Slab Width	7.5 m	Slab Length	7.5 m	Number of Slab	16

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number: 38 | Sample Area: 900

Distress Code	L	M	H
62		1	1
63		2	1
65		2	3
67			1
68		1	1
72			2

Sketch / comment

Sample Number: 40 | Sample Area: 900

Distress Code	L	M	H
62		1	1
63		3	2
65		1	3
71		2	
74		1	1

Sample Number: | Sample Area:

Distress Code	L	M	H

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		**Inspector Name**	
From	**0+000 Maintenace Apron**	**Branch Use**	**Mainte**
		Date Inspected	**07.08.2017**
To	**0+262 Maintenace Apron**	**Section Width**	**225**
		Section Length	**262.5**
Slab Width	**7.5 m**	**Slab Length**	**7.5 m**
Number of Slab	**25**		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 3 — Sample Area 1406.25

Distress Code	L	M	H
62	1	1	
63	1	1	
65	2		1
73	1		

Sketch / comment

Sample Number 5 — Sample Area 1406.25

Distress Code	L	M	H
62		1	
63			2
66	1		
74		1	
72			2

Sample Number 7 — Sample Area 1406.25

Distress Code	L	M	H
62			2
63			3
65	1	2	
71		1	
72			3

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		**Inspector Name**			
From	**0+000 Maintenace Apron**	**Branch Use**	**Mainte**	**Date Inspected**	**07.08.2017**
To	**0+262 Maintenace Apron**	**Section Width**	**225**	**Section Length**	**262.5**
Slab Width **7.5 m**	**Slab Length** **7.5 m**	**Number of Slab**	**25**		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sketch / comment

Sample Number 9 — Sample Area 1406.25

Distress Code	L	M	H
62		2	
63		1	2
65		3	3
72			3

Sample Number 11 — Sample Area 1406.25

Distress Code	L	M	H
62			1
63		1	1
65		2	2
73	1		

Sample Number 13 — Sample Area 1406.25

Distress Code	L	M	H
62	1		
63		1	1
65	1	2	
74	1		

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name	
From	0+000 Maintenance Apron	Branch Use	Mainte	Date Inspected	07.08.2017
To	0+262 Maintenance Apron	Section Width	225	Section Length	262.5
Slab Width	7.5 m	Slab Length	7.5 m	Number of Slab	25

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 15 — Sample Area 1406.25

Distress Code	L	M	H
62		1	
63		1	1
65	2	1	1
74	1		

Sketch / comment

Sample Number 17 — Sample Area 1406.25

Distress Code	L	M	H
62		1	
63		1	1
65	2	1	1
75		1	

Sample Number 19 — Sample Area 1406.25

Distress Code	L	M	H
62	1	1	
63		1	2
65	1	2	3
74		2	

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	0+000 Maintenace Apron	Branch Use	Mainte	Date Inspected	07.08.2017
To	0+262 Maintenace Apron	Section Width	225	Section Length	262.5
Slab Width 7.5 m	Slab Length 7.5 m	Number of Slab	25		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 21, Sample Area 1406.25

Distress Code	L	M	H
62		2	1
63		1	2
65		1	3
66	1		

Sketch / comment

Sample Number 23, Sample Area 1406.25

Distress Code	L	M	H
62		2	1
63		1	2
65	1	2	1
74	1		

Sample Number 25, Sample Area 1406.25

Distress Code	L	M	H
63		2	3
65	1	2	3
75	1		

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	0+000 Maintenace Apron	Branch Use	Mainte	Date Inspected	07.08.2017
To	0+262 Maintenace Apron	Section Width	225	Section Length	262.5
Slab Width 7.5 m	Slab Length 7.5 m	Number of Slab	25		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 27, Sample Area 1406.25

Distress Code	L	M	H
62		2	1
63		2	2
65		2	3
66	1		

Sketch / comment

Sample Number 29, Sample Area 1406.25

Distress Code	L	M	H
63			3
65	1	3	1
73	1		

Sample Number 31, Sample Area 1406.25

Distress Code	L	M	H
62	1		1
63		2	1
65	2	1	2
74		1	

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name		
From	0+000 Maintenace Apron	Branch Use	Mainte	Date Inspected: 07.08.2017
To	0+262 Maintenace Apron	Section Width	225	Section Length: 262.5
Slab Width	7.5 m	Slab Length: 7.5 m	Number of Slab	25

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 33, Sample Area 1406.25

Distress Code	L	M	H
62		1	
63		2	1
65	2	1	1
67	1		

Sketch / comment

Sample Number 35, Sample Area 1406.25

Distress Code	L	M	H
63		2	3
65		2	1
74	1		

Sample Number 37, Sample Area 1406.25

Distress Code	L	M	H
63		2	1
66	1		
71	1		
73	1		

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		**Inspector Name**	
From	**0+000 Maintenace Apron**	**Branch Use** **Mainte**	**Date Inspected** **07.08.2017**
To	**0+262 Maintenace Apron**	**Section Width** **225**	**Section Length** **262.5**
Slab Width **7.5 m**	**Slab Length** **7.5 m**	**Number of Slab**	**25**

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 39 Sample Area 1406.25

Distress Code	L	M	H
62	1		1
63		2	
65	2		1
67	1		

Sketch / comment

Sample Number Sample Area

Distress Code	L	M	H

Sample Number Sample Area

Distress Code	L	M	H

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID				Inspector Name			
From	0+000 North Apron Old			Branch Use	North-O	Date Inspected	08.08.2017
To	0+450 North Apron Old			Section Width	225	Section Length	450
Slab Width	7.5 m	Slab Length	7.5 m	Number of Slab	25		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number: 2 | Sample Area: 1406.25

Distress Code	L	M	H
62		2	2
63		3	3
65	1	5	4
66		2	2
72			1

Sketch / comment

Sample Number: 5 | Sample Area: 1406.25

Distress Code	L	M	H
62			2
63		2	2
65		4	2
67			3
72			2

Sample Number: 8 | Sample Area: 1406.25

Distress Code	L	M	H
62	1		4
63	3	1	3
65	2	4	5
67		2	2
72			3

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET					
PID		Inspector Name			
From	0+000 North Apron Old	Branch Use	North-O	Date Inspected	08.08.2017
To	0+450 North Apron Old	Section Width	225	Section Length	450
Slab Width 7.5 m	Slab Length 7.5 m	Number of Slab	25		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin;	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 11 — Sample Area 1406.25

Distress Code	L	M	H
62		2	1
63		2	3
65	4	3	3
67		2	
74		2	

Sketch / comment

Sample Number 14 — Sample Area 1406.25

Distress Code	L	M	H
62			2
63		2	2
65	1	3	3
67			3
72			2

Sample Number 17 — Sample Area 1406.25

Distress Code	L	M	H
62			4
63		3	3
65		2	4
66		3	
72			2

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	0+000 North Apron Old	Branch Use	North-O	Date Inspected	08.08.2017
To	0+450 North Apron Old	Section Width	225	Section Length	450
Slab Width 7.5 m	Slab Length 7.5 m	Number of Slab	25		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 20, Sample Area 1406.25

Distress Code	L	M	H
62		1	3
63	2		5
65	3	2	4
67		1	3
72			1

Sketch / comment

Sample Number 23, Sample Area 1406.25

Distress Code	L	M	H
62	3		2
63	2	1	1
65	4	1	3
66		3	
71			2

Sample Number 26, Sample Area 1406.25

Distress Code	L	M	H
62		2	2
63		2	3
65		4	3
67		2	3
72			4

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET			
PID		Inspector Name	
From	0+000 North Apron Old	Branch Use	North-O
		Date Inspected	08.08.2017
To	0+450 North Apron Old	Section Width	225
		Section Length	450
Slab Width	7.5 m	Slab Length	7.5 m
Number of Slab	25		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number: 29 Sample Area: 1406.25

Distress Code	L	M	H
62		1	1
63		2	2
65		3	4
71		1	1
72			2

Sketch / comment

Sample Number: 32 Sample Area: 1406.25

Distress Code	L	M	H
62			2
63		2	2
65		4	3
66			3
72			2

Sample Number: 35 Sample Area: 1406.25

Distress Code	L	M	H
62		3	3
63		2	4
65		3	
72			2

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET			
PID		Inspector Name	
From	0+000 North Apron Old	Branch Use: North-O	Date Inspected: 08.08.2017
To	0+450 North Apron Old	Section Width: 225	Section Length: 450
Slab Width: 7.5 m	Slab Length: 7.5 m	Number of Slab	25

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number: 38 — Sample Area: 1406.25

Distress Code	L	M	H
62			2
63		2	6
65	4	2	4
75		3	

Sketch / comment

Sample Number: 41 — Sample Area: 1406.25

Distress Code	L	M	H
62		1	1
63	2	2	4
65		4	4
74	2		1
75		3	

Sample Number: 44 — Sample Area: 1406.25

Distress Code	L	M	H
62		1	1
63		2	3
65		3	4
71		1	1
72			1

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	0+000 North Apron Old	Branch Use	North-O	Date Inspected	08.08.2017
To	0+450 North Apron Old	Section Width	225	Section Length	450
Slab Width	7.5 m	Slab Length	7.5 m	Number of Slab	25

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sketch / comment

Sample Number	47	Sample Area	1406.25
Distress Code	L	M	H
62		2	2
63		3	3
65	1	5	4
66		2	2
72			1

Sample Number	50	Sample Area	1406.25
Distress Code	L	M	H
62	1		4
63		2	3
65	3	2	4
66		1	2
71		1	1

Sample Number	53	Sample Area	1406.25
Distress Code	L	M	H
62	2		3
63	1		5
65	1	4	2
67	2		2
72			1

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name	
From	0+000 North Apron Old	Branch Use: North-O	Date Inspected: 08.08.2017
To	0+450 North Apron Old	Section Width: 225	Section Length: 450
Slab Width: 7.5 m	Slab Length: 7.5 m	Number of Slab	25

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number: 56 — Sample Area: 1406.25

Distress Code	L	M	H
62			2
63		2	2
65		4	3
71		1	1
72			2

Sketch / comment

Sample Number: 59 — Sample Area: 1406.25

Distress Code	L	M	H
62		1	1
63		2	2
65		4	3
66			3
71			2

Sample Number: 62 — Sample Area: 1406.25

Distress Code	L	M	H
62		1	2
63	1	2	
65		2	2
73	3	2	

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET			
PID		Inspector Name	
From	0+000 North Apron Old	Branch Use: North-O	Date Inspected: 08.08.2017
To	0+450 North Apron Old	Section Width: 225	Section Length: 450
Slab Width: 7.5 m	Slab Length: 7.5 m	Number of Slab	25

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number: 65 — Sample Area: 1406.25

Distress Code	L	M	H
62			4
63		4	2
65	2	5	1
73	1	2	

Sketch / comment

Sample Number: 68 — Sample Area: 1406.25

Distress Code	L	M	H
62			3
63		2	2
65		3	3
72			1

Sample Number: 71 — Sample Area: 1406.25

Distress Code	L	M	H
62	1	1	3
63		3	2
65		3	4
67		1	1
72			1

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	0+450 North Apron New	Branch Use	North-N	Date Inspected	11.08.2017
To	0+625 North Apron New	Section Width	225	Section Length	175
Slab Width 5 m	Slab Length 5 m	Number of Slab	25		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 7, Sample Area 625

Distress Code	L	M	H
62	1		
63	1		
73		2	

Sketch / comment

Sample Number 9, Sample Area 625

Distress Code	L	M	H
62			1
63			1
73		2	1

Sample Number 11, Sample Area 625

Distress Code	L	M	H
62			1
73			1

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	0+450 North Apron New	Branch Use	North-N	Date Inspected	11.08.2017
To	0+625 North Apron New	Section Width	225	Section Length	175
Slab Width 5 m	Slab Length 5 m	Number of Slab	25		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin;	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 13 — Sample Area 625

Distress Code	L	M	H
73	1		

Sketch / comment

Sample Number 15 — Sample Area 625

Distress Code	L	M	H
62	1		
73	1		

Sample Number 17 — Sample Area 625

Distress Code	L	M	H
63		1	
73	1		

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		**Inspector Name**			
From	**0+450 North Apron New**	**Branch Use**	**North-N**	**Date Inspected**	**11.08.2017**
To	**0+625 North Apron New**	**Section Width**	**225**	**Section Length**	**175**
Slab Width 5 m	**Slab Length** 5 m	**Number of Slab**	**25**		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 19 — Sample Area 625

Distress Code	L	M	H
65	1	1	

Sketch / comment

Sample Number 21 — Sample Area 625

Distress Code	L	M	H
65		2	

Sample Number 23 — Sample Area 625

Distress Code	L	M	H
65		2	
73	1		

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	0+450 North Apron New	Branch Use	North-N	Date Inspected	11.08.2017
To	0+625 North Apron New	Section Width	225	Section Length	175
Slab Width 5 m	Slab Length 5 m	Number of Slab	25		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 25 — Sample Area 625

Distress Code	L	M	H
62	1		
65		3	

Sketch / comment

Sample Number 27 — Sample Area 625

Distress Code	L	M	H
63	1	1	
65		3	

Sample Number 29 — Sample Area 625

Distress Code	L	M	H
65		3	
73	1		

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET			
PID		Inspector Name	
From	0+450 North Apron New	Branch Use: North-N	Date Inspected: 11.08.2017
To	0+625 North Apron New	Section Width: 225	Section Length: 175
Slab Width: 5 m	Slab Length: 5 m	Number of Slab	25

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin;	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 31, Sample Area 625

Distress Code	L	M	H
65	2	2	
73	1	1	

Sketch / comment

Sample Number 33, Sample Area 625

Distress Code	L	M	H
62	1	2	
65	3	2	

Sample Number 35, Sample Area 625

Distress Code	L	M	H
73		2	

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name	
From	0+450 North Apron New	Branch Use: North-N	Date Inspected: 11.08.2017
To	0+625 North Apron New	Section Width: 225	Section Length: 175
Slab Width: 5 m	Slab Length: 5 m	Number of Slab	25

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 37, Sample Area 625

Distress Code	L	M	H
62	3		
63	2	1	

Sketch / comment

Sample Number 39, Sample Area 625

Distress Code	L	M	H
62	1	2	
65	2	1	

Sample Number 41, Sample Area 625

Distress Code	L	M	H
65	1	2	
73		3	

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name	
From	0+450 North Apron New	Branch Use	North-N
		Date Inspected	11.08.2017
To	0+625 North Apron New	Section Width	225
		Section Length	175
Slab Width	5 m	Slab Length	5 m
Number of Slab	25		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 43 Sample Area 625

Distress Code	L	M	H
62	2	3	
65	1	3	

Sketch / comment

Sample Number 45 Sample Area 625

Distress Code	L	M	H
65	1	4	
73	3	1	

Sample Number 47 Sample Area 625

Distress Code	L	M	H
73	1		1
62			1

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		**Inspector Name**			
From	**0+450 North Apron New**	**Branch Use**	**North-N**	**Date Inspected**	**11.08.2017**
To	**0+625 North Apron New**	**Section Width**	**225**	**Section Length**	**175**
Slab Width 5 m	**Slab Length** 5 m	**Number of Slab**	**25**		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 49 Sample Area 625

Distress Code	L	M	H
65	3	2	1
73	1	1	

Sketch / comment

Sample Number 51 Sample Area 625

Distress Code	L	M	H
62	1		
63	1	2	
73			1

Sample Number Sample Area

Distress Code	L	M	H

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	0+000 South Apron Old	Branch Use	South-O	Date Inspected	10.08.2017
To	0+450 South Apron Old	Section Width	225	Section Length	450
Slab Width 7.5 m	Slab Length 7.5 m	Number of Slab	25		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 1, Sample Area 1406.25

Distress Code	L	M	H
63	1	2	1
65	3	2	4
67		3	1
68	1		
71		1	

Sketch / comment

Sample Number 4, Sample Area 1406.25

Distress Code	L	M	H
62			2
63		2	2
65		4	2
66			3
72			2

Sample Number 7, Sample Area 1406.25

Distress Code	L	M	H
62	1		4
63	2	1	3
65	1	5	4
67		2	2
71		1	2

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET							
PID				Inspector Name			
From	0+000 South Apron Old			Branch Use	South-O	Date Inspected	10.08.2017
To	0+450 South Apron Old			Section Width	225	Section Length	450
Slab Width	7.5 m	Slab Length	7.5 m	Number of Slab	25		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number	10	Sample Area	1406.25
Distress Code	**L**	**M**	**H**
62		1	2
63		2	3
65	4	3	3
66			2
72		2	

Sketch / comment

Sample Number	13	Sample Area	1406.25
Distress Code	**L**	**M**	**H**
62			2
63		2	2
65		2	4
67			3
72			2

Sample Number	16	Sample Area	1406.25
Distress Code	**L**	**M**	**H**
62			4
63		3	3
65		2	4
67		3	
72			2

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	0+000 South Apron Old	Branch Use	South-O	Date Inspected	10.08.2017
To	0+450 South Apron Old	Section Width	225	Section Length	450
Slab Width 7.5 m	Slab Length 7.5 m	Number of Slab	25		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 19 — Sample Area 1406.25

Distress Code	L	M	H
62		1	3
63	2		5
65	3	2	4
67		1	3
74		2	1

Sketch / comment

Sample Number 22 — Sample Area 1406.25

Distress Code	L	M	H
62	3		2
63	2	1	1
65	4	1	3
67		3	
71		2	

Sample Number 25 — Sample Area 1406.25

Distress Code	L	M	H
62		2	2
63		2	3
65		4	3
67		2	3
72		2	2

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name		
From	0+000 South Apron Old	Branch Use	South-O	Date Inspected	10.08.2017
To	0+450 South Apron Old	Section Width	225	Section Length	450
Slab Width 7.5 m	Slab Length 7.5 m	Number of Slab	25		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sketch / comment

Sample Number 28, Sample Area 1406.25

Distress Code	L	M	H
62		1	1
63		2	2
65		3	4
74		1	1
75			2

Sample Number 31, Sample Area 1406.25

Distress Code	L	M	H
62			2
63		2	2
65		4	3
66			3
72			2

Sample Number 34, Sample Area 1406.25

Distress Code	L	M	H
62		3	3
63		2	4
65		3	1
72			2
75			2

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	0+000 South Apron Old	Branch Use	South-O	Date Inspected	10.08.2017
To	0+450 South Apron Old	Section Width	225	Section Length	450

Slab Width	7.5 m	Slab Length	7.5 m	Number of Slab	25

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 37 | Sample Area 1406.25

Distress Code	L	M	H
62			2
63		2	5
65	3	2	4
72		1	

Sketch / comment

Sample Number 40 | Sample Area 1406.25

Distress Code	L	M	H
62		2	1
63	2	2	4
65		5	2
73	2		
75	1	3	

Sample Number 43 | Sample Area 1406.25

Distress Code	L	M	H
62		1	1
63		2	3
65		3	4
71		1	1
72			1

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name	
From	0+000 South Apron Old	Branch Use: South-O	Date Inspected: 10.08.2017
To	0+450 South Apron Old	Section Width: 225	Section Length: 450
Slab Width: 7.5 m	Slab Length: 7.5 m	Number of Slab	25

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 46, Sample Area 1406.25

Distress Code	L	M	H
62		3	2
63		3	3
65		3	4
67		2	2
72			1

Sketch / comment

Sample Number 49, Sample Area 1406.25

Distress Code	L	M	H
62	1		4
63		2	3
65	3	2	4
71		2	

Sample Number 52, Sample Area 1406.25

Distress Code	L	M	H
62	2		3
63	1		5
65	1	4	2
66	2		2
72			1

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET					
PID		Inspector Name			
From	0+000 South Apron Old	Branch Use	South-O	Date Inspected	10.08.2017
To	0+450 South Apron Old	Section Width	225	Section Length	450
Slab Width 7.5 m	Slab Length 7.5 m	Number of Slab	25		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 55, Sample Area 1406.25

Distress Code	L	M	H
62			2
63		2	2
65		4	3
71		1	
72		1	2

Sketch / comment

Sample Number 58, Sample Area 1406.25

Distress Code	L	M	H
62		1	1
63		2	2
65		4	3
66			3

Sample Number 61, Sample Area 1406.25

Distress Code	L	M	H
62		1	2
63		2	1
65		2	2
72		2	

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name	
From	0+000 South Apron Old	Branch Use: South-O	Date Inspected: 10.08.2017
To	0+450 South Apron Old	Section Width: 225	Section Length: 450
Slab Width: 7.5 m	Slab Length: 7.5 m	Number of Slab	25

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number: 64 — Sample Area: 1406.25

Distress Code	L	M	H
62			4
63		4	2
65	3	5	
74	1	2	

Sketch / comment

Sample Number: 67 — Sample Area: 1406.25

Distress Code	L	M	H
62			3
63		2	2
65		3	3
72			1

Sample Number: 70 — Sample Area: 1406.25

Distress Code	L	M	H
62		2	3
63		3	2
65		3	4
72		1	1
74		1	

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name	
From	0+450 South Apron New	Branch Use	South-N	Date Inspected	12.08.2017
To	0+645 South Apron New	Section Width	225	Section Length	177.7
Slab Width 5 m	Slab Length 5 m	Number of Slab	25

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 8, Sample Area 625

Distress Code	L	M	H
62	1	1	
65	1	2	
73		2	

Sketch / comment

Sample Number 10, Sample Area 625

Distress Code	L	M	H
62		1	1
63		2	
73	1	2	

Sample Number 12, Sample Area 625

Distress Code	L	M	H
62		1	1
73		1	1

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET					
PID		Inspector Name			
From	0+450 South Apron New	Branch Use	South-N	Date Inspected	12.08.2017
To	0+645 South Apron New	Section Width	225	Section Length	177.7
Slab Width 5 m	Slab Length 5 m	Number of Slab	25		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 14 — Sample Area 625

Sketch / comment

Distress Code	L	M	H
73	1		

Sample Number 16 — Sample Area 625

Distress Code	L	M	H
62	1		
73	1		

Sample Number 18 — Sample Area 625

Distress Code	L	M	H
63		1	
73	1		

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET							
PID				Inspector Name			
From	0+450 South Apron New			Branch Use	South-N	Date Inspected	12.08.2017
To	0+645 South Apron New			Section Width	225	Section Length	177.7
Slab Width	5 m	Slab Length	5 m	Number of Slab		25	

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number	20	Sample Area	625
Distress Code	L	M	H
65	1	2	
63		2	

Sketch / comment

Sample Number	22	Sample Area	625
Distress Code	L	M	H
65		2	

Sample Number	24	Sample Area	625
Distress Code	L	M	H
65		2	
73	1		

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name			
From	0+450 South Apron New	Branch Use	South-N	Date Inspected	12.08.2017
To	0+645 South Apron New	Section Width	225	Section Length	177.7
Slab Width 5 m	Slab Length 5 m	Number of Slab	25		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 26, Sample Area 625

Distress Code	L	M	H
63	1		
65		3	

Sketch / comment

Sample Number 28, Sample Area 625

Distress Code	L	M	H
63	1	1	
65		3	

Sample Number 30, Sample Area 625

Distress Code	L	M	H
65		3	
73	2		

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET							
PID				Inspector Name			
From	0+450 South Apron New			Branch Use	South-N	Date Inspected	12.08.2017
To	0+645 South Apron New			Section Width	225	Section Length	177.7
Slab Width	5 m	Slab Length	5 m	Number of Slab	25		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Cracking	68.Popouts	72.Shattered Slab	76. ASR

Sample Number	32	Sample Area	625
Distress Code	L	M	H
65	1	2	1
73	2		

Sketch / comment

Sample Number	34	Sample Area	625
Distress Code	L	M	H
63	1	2	
65	3	2	

Sample Number	36	Sample Area	625
Distress Code	L	M	H
73		2	

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		**Inspector Name**			
From	**0+450 South Apron New**	**Branch Use**	**South-N**	**Date Inspected**	**12.08.2017**
To	**0+645 South Apron New**	**Section Width**	**225**	**Section Length**	**177.7**
Slab Width 5 m	**Slab Length** 5 m	**Number of Slab**	**25**		

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 38, Sample Area 625

Distress Code	L	M	H
63	3		
65	2	1	

Sketch / comment

Sample Number 40, Sample Area 625

Distress Code	L	M	H
62	1	2	
65	2	1	

Sample Number 42, Sample Area 625

Distress Code	L	M	H
65	1	3	
73	2	1	

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET			
PID		Inspector Name	
From	0+450 South Apron New	Branch Use	South-N	Date Inspected	12.08.2017
To	0+645 South Apron New	Section Width	225	Section Length	177.7
Slab Width 5 m	Slab Length 5 m	Number of Slab	25

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number 44 — Sample Area 625

Distress Code	L	M	H
62	2	3	
65	1	3	

Sketch / comment

Sample Number 46 — Sample Area 625

Distress Code	L	M	H
65	1	4	
73	3	2	

Sample Number 48 — Sample Area 625

Distress Code	L	M	H
63	1	2	1
73	1		1

PCC AIRFIELD PAVEMNT CONDITION SURVEY DATA SHEET

PID		Inspector Name	
From	0+450 South Apron New	Branch Use: South-N	Date Inspected: 12.08.2017
To	0+645 South Apron New	Section Width: 225	Section Length: 177.7
Slab Width: 5 m	Slab Length: 5 m	Number of Slab	25

PPC Surfaced Distress Codes

61. Blowup	65. Joint Seak Damage	69.Pumping	73. Shrinkage Cracks
62. Corner Break	66. Patching Small	70. Scaling	74. Spalling, Joints
63. Cracks	67.Patching Large	71. Settlement/Faulting	75. Spalling, Corner
64. Durability Crackin	68.Popouts	72.Shattered Slab	76. ASR

Sample Number: 50 Sample Area: 625

Distress Code	L	M	H
65	3	2	
73	1	2	

Sketch / comment

Sample Number: 52 Sample Area: 625

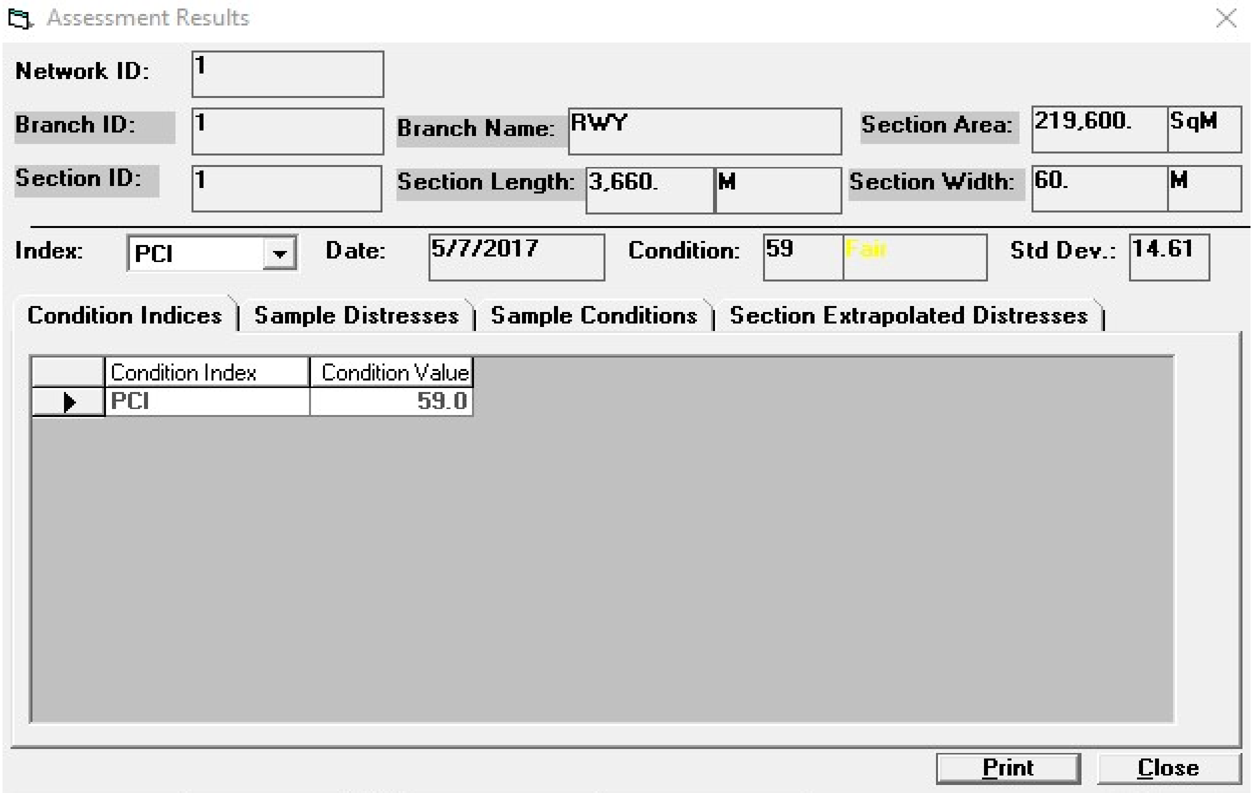
Distress Code	L	M	H
62	1	1	
65	1	2	

Sample Number Sample Area

Distress Code	L	M	H

Appendix C

PCI Output


Assessment Results

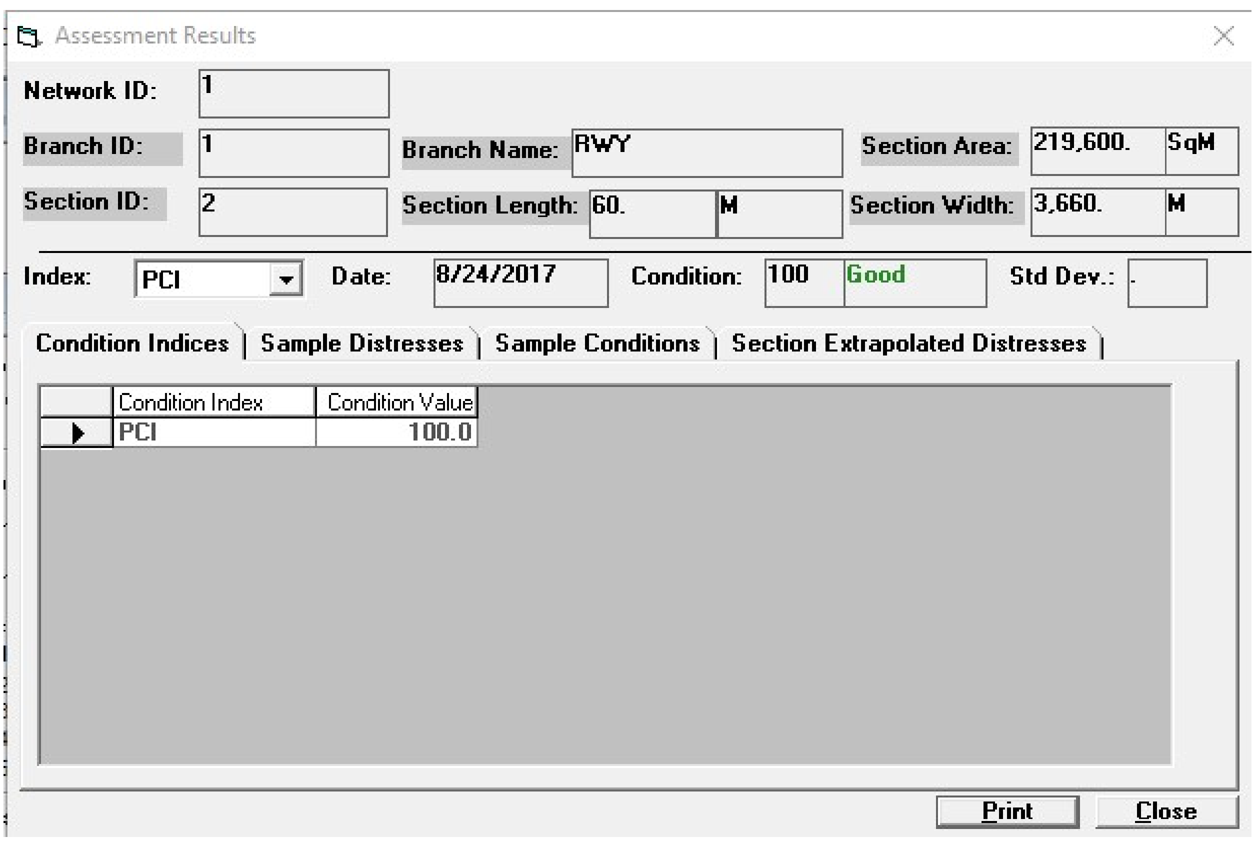
Network ID: 1
Branch ID: 1 | Branch Name: RWY | Section Area: 219,600. SqM
Section ID: 1 | Section Length: 3,660. M | Section Width: 60. M

Index: PCI | Date: 5/7/2017 | Condition: 59 Fair | Std Dev.: 14.61

Condition Indices | Sample Distresses | Sample Conditions | Section Extrapolated Distresses

Condition Index	Condition Value
PCI	59.0

Print Close


Assessment Results

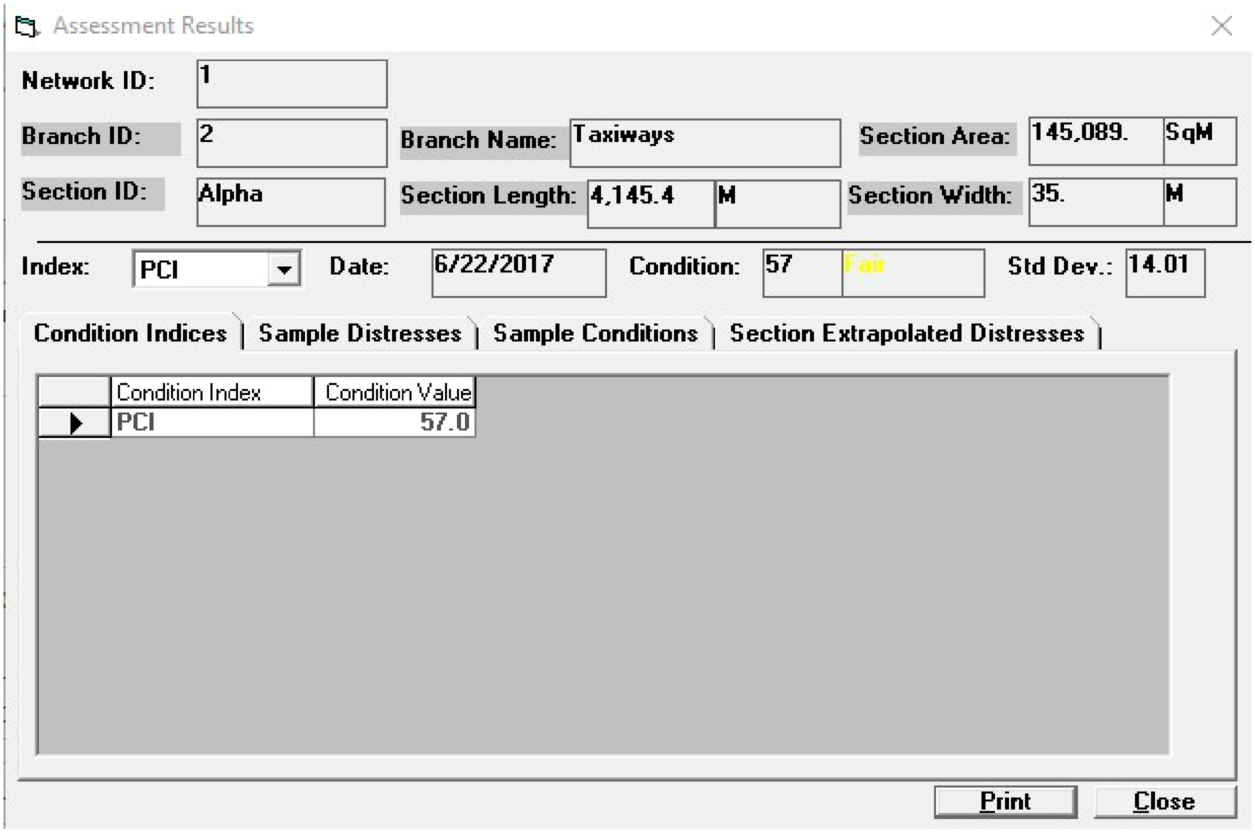
Network ID: 1
Branch ID: 1 | Branch Name: RWY | Section Area: 219,600. SqM
Section ID: 2 | Section Length: 60. M | Section Width: 3,660. M

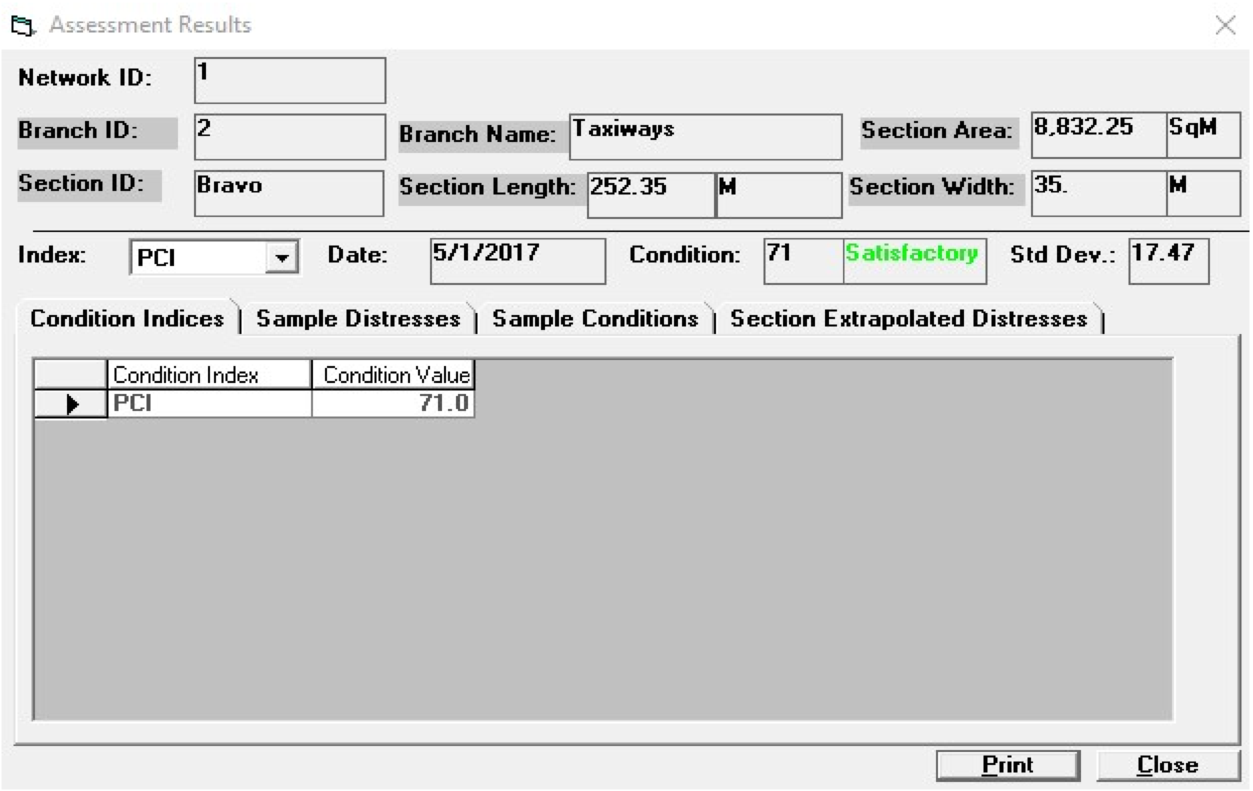
Index: PCI | Date: 8/24/2017 | Condition: 100 Good | Std Dev.: .

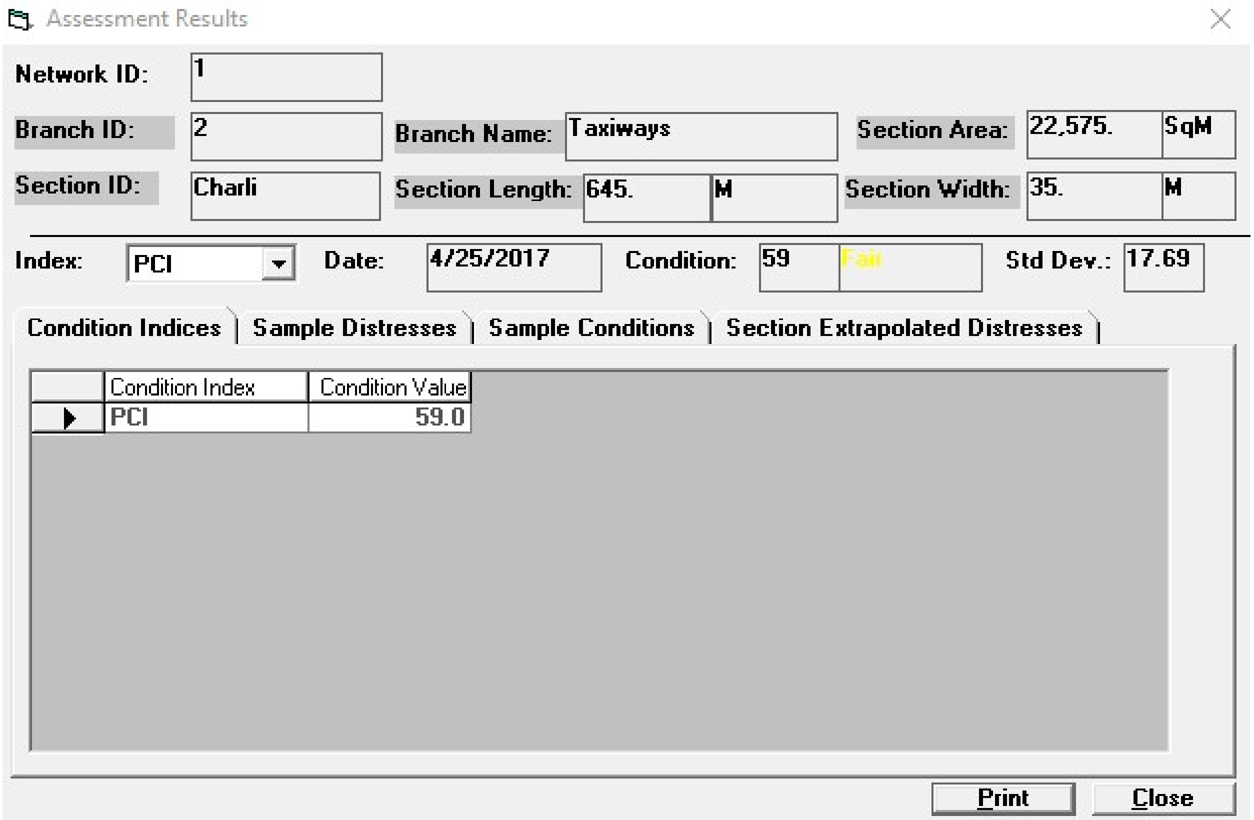
Condition Indices | Sample Distresses | Sample Conditions | Section Extrapolated Distresses

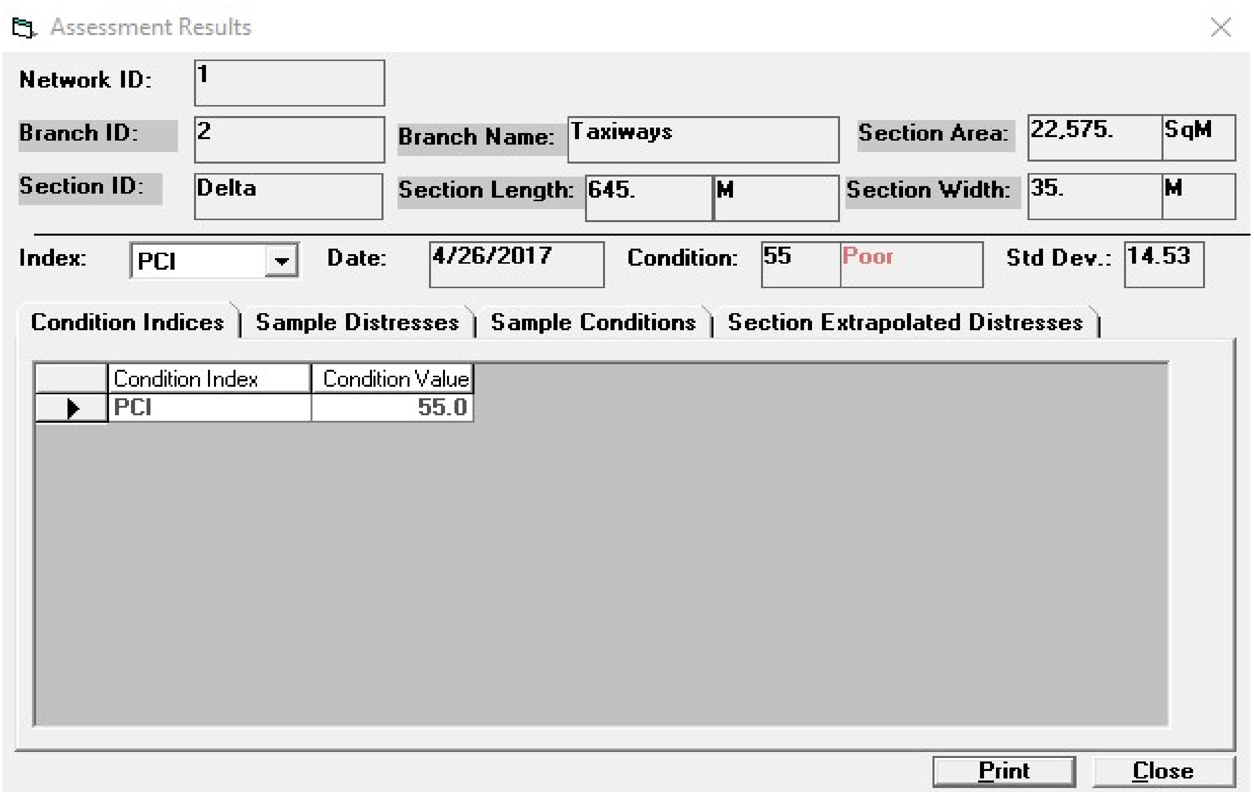
Condition Index	Condition Value
PCI	100.0

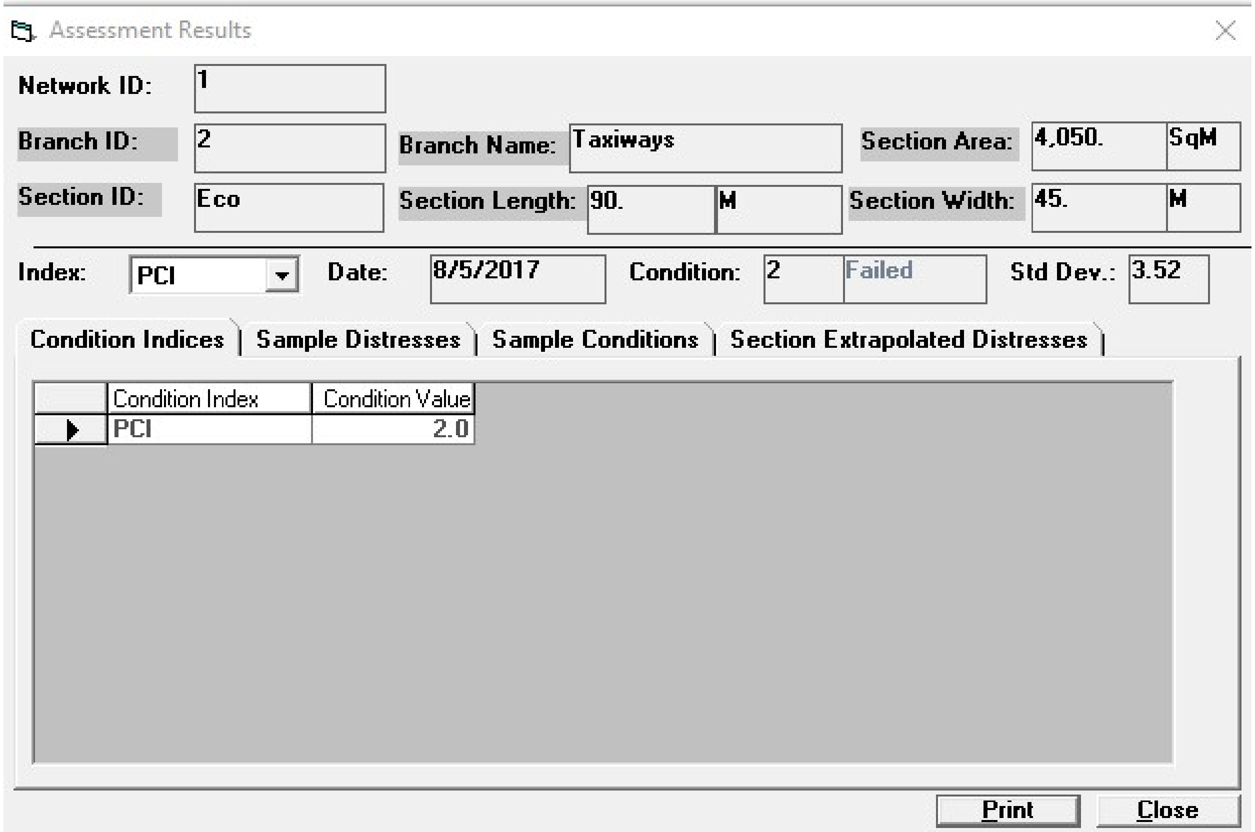
Print Close

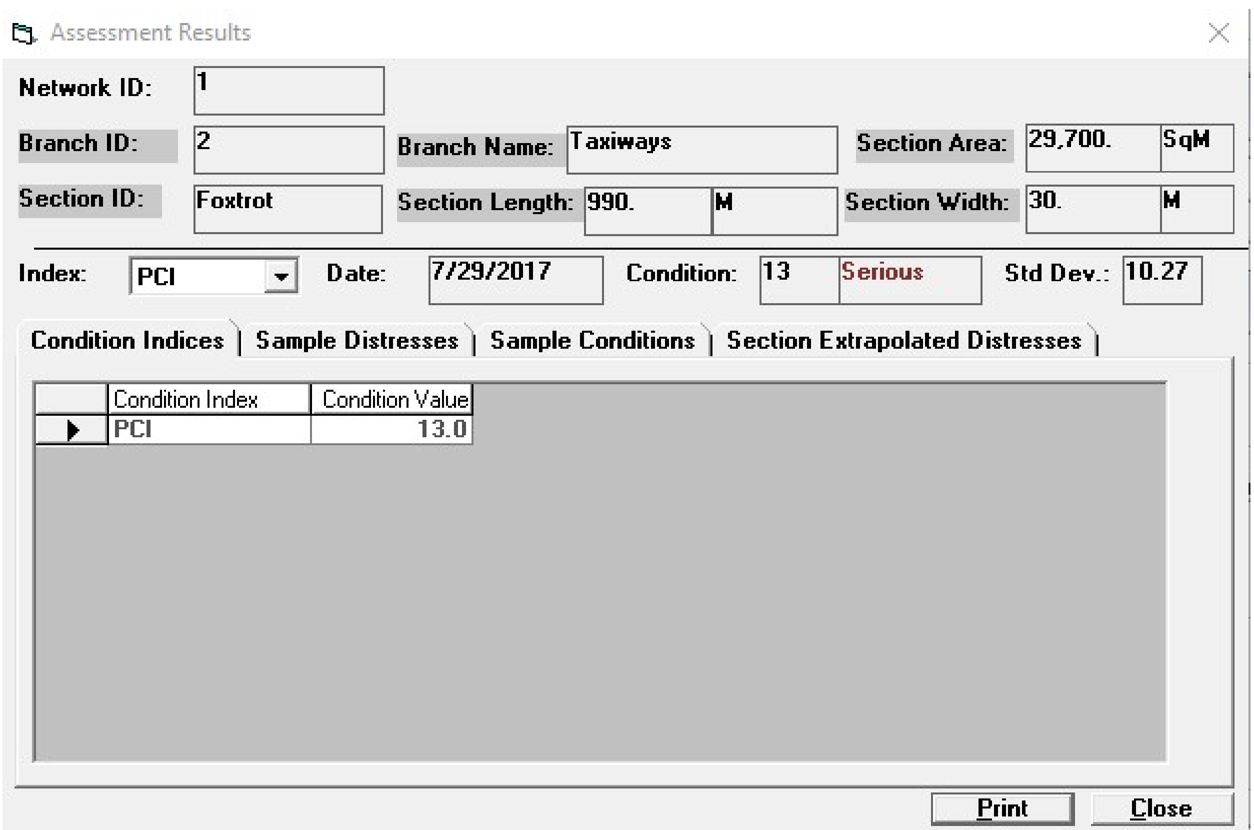

Assessment Results
Network ID: 1
Branch ID: 2
Branch Name: Taxiways
Section Area: 145,089. SqM
Section ID: Alpha
Section Length: 4,145.4 M
Section Width: 35. M
Index: PCI
Date: 6/22/2017
Condition: 57 Fair
Std Dev.: 14.01
Condition Indices
Sample Distresses
Sample Conditions
Section Extrapolated Distresses
Condition Index
Condition Value
PCI 57.0
Print
Close

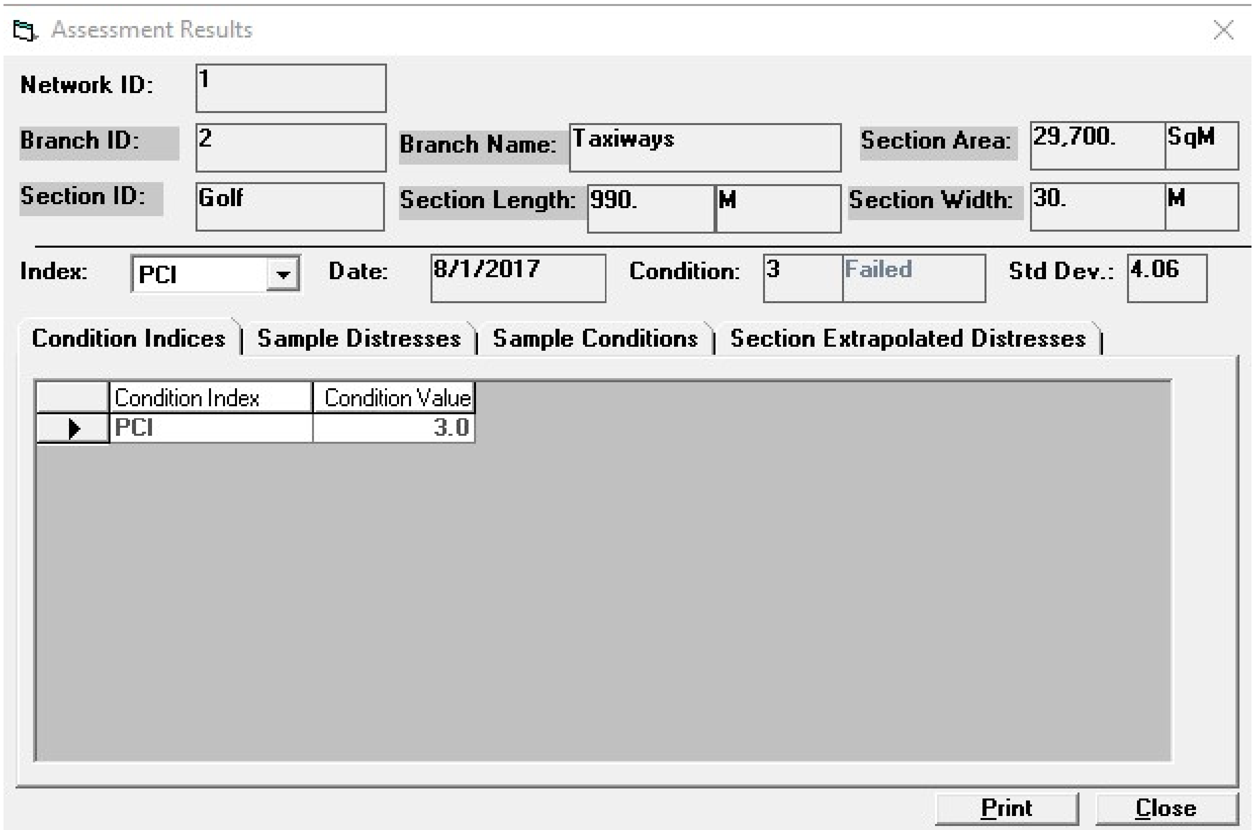

Assessment Results
Network ID: 1
Branch ID: 2
Branch Name: Taxiways
Section Area: 8,832.25 SqM
Section ID: Bravo
Section Length: 252.35 M
Section Width: 35. M
Index: PCI
Date: 5/1/2017
Condition: 71 Satisfactory
Std Dev.: 17.47
Condition Indices
Sample Distresses
Sample Conditions
Section Extrapolated Distresses
Condition Index
Condition Value
PCI 71.0
Print
Close

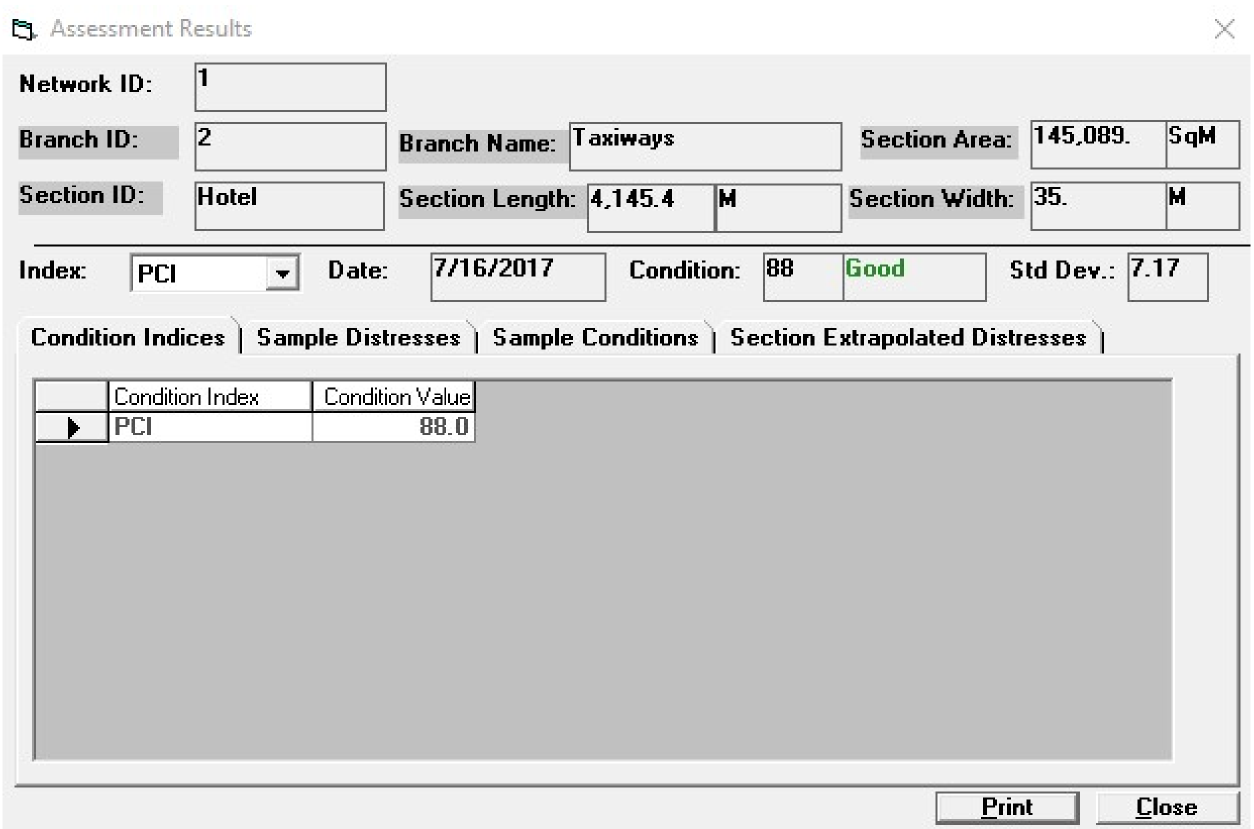

Assessment Results
Network ID: 1
Branch ID: 2
Branch Name: Taxiways
Section Area: 22,575. SqM
Section ID: Charli
Section Length: 645. M
Section Width: 35. M
Index: PCI
Date: 4/25/2017
Condition: 59 Fair
Std Dev.: 17.69
Condition Indices
Sample Distresses
Sample Conditions
Section Extrapolated Distresses
Condition Index
Condition Value
PCI
59.0
Print
Close

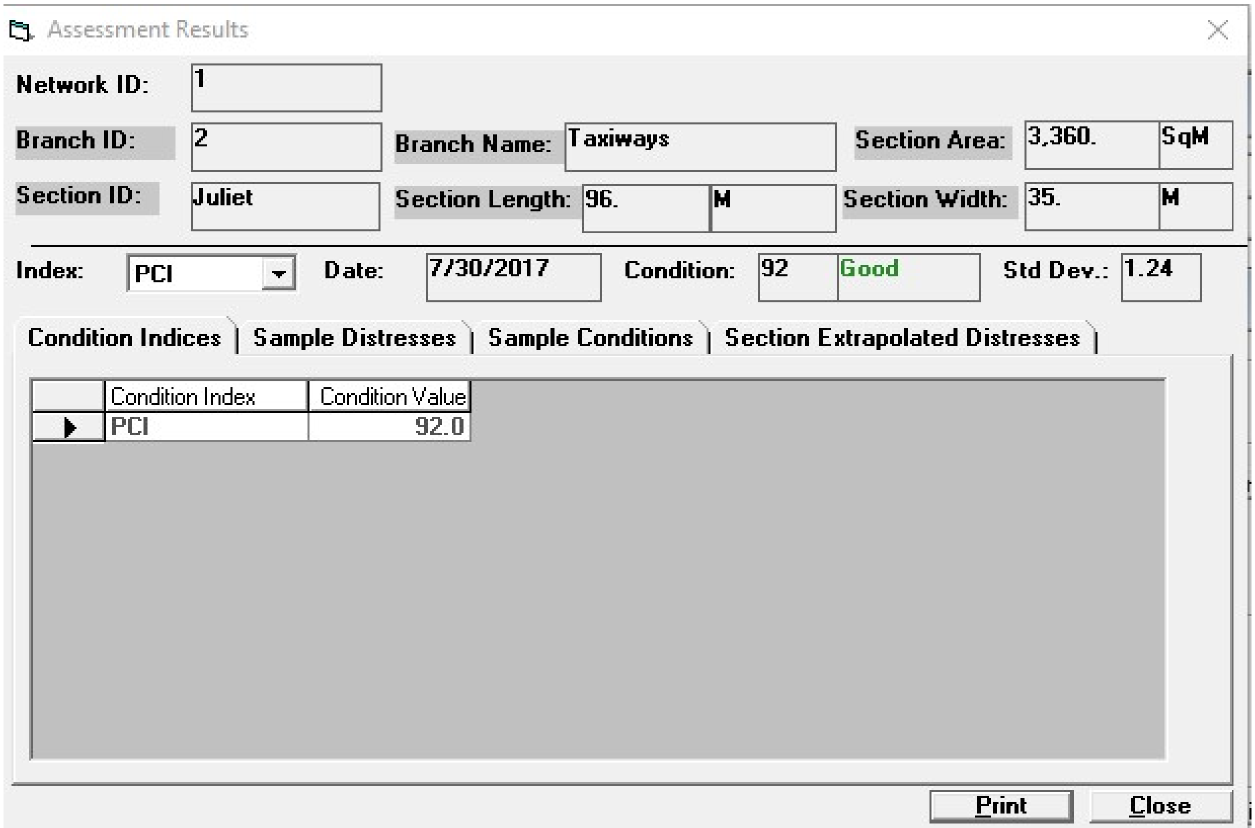

Assessment Results
Network ID: 1
Branch ID: 2
Branch Name: Taxiways
Section Area: 22,575. SqM
Section ID: Delta
Section Length: 645. M
Section Width: 35. M
Index: PCI
Date: 4/26/2017
Condition: 55 Poor
Std Dev.: 14.53
Condition Indices
Sample Distresses
Sample Conditions
Section Extrapolated Distresses
Condition Index
Condition Value
PCI
55.0
Print
Close

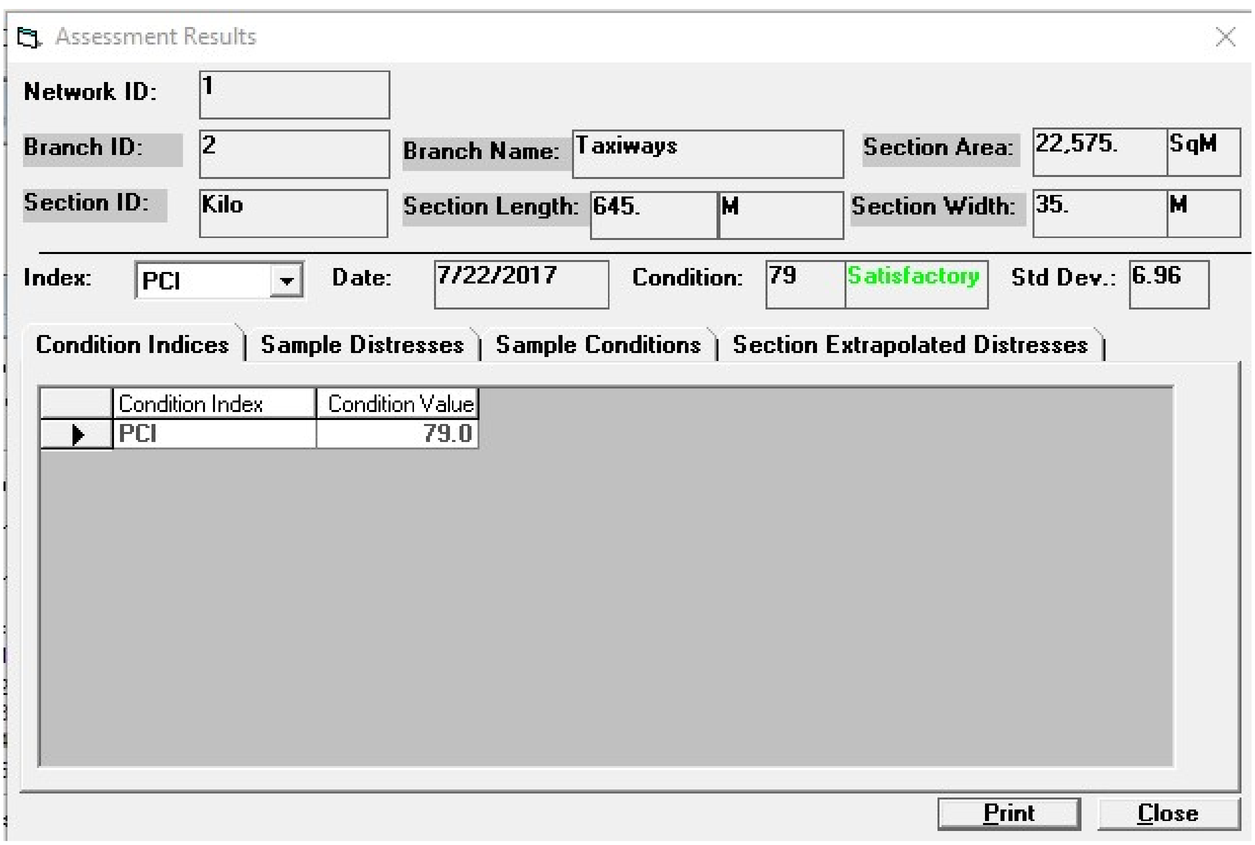

Assessment Results
Network ID: 1
Branch ID: 2
Branch Name: Taxiways
Section Area: 4,050. SqM
Section ID: Eco
Section Length: 90. M
Section Width: 45. M
Index: PCI
Date: 8/5/2017
Condition: 2 Failed
Std Dev.: 3.52
Condition Indices
Sample Distresses
Sample Conditions
Section Extrapolated Distresses
Condition Index
Condition Value
PCI
2.0
Print
Close

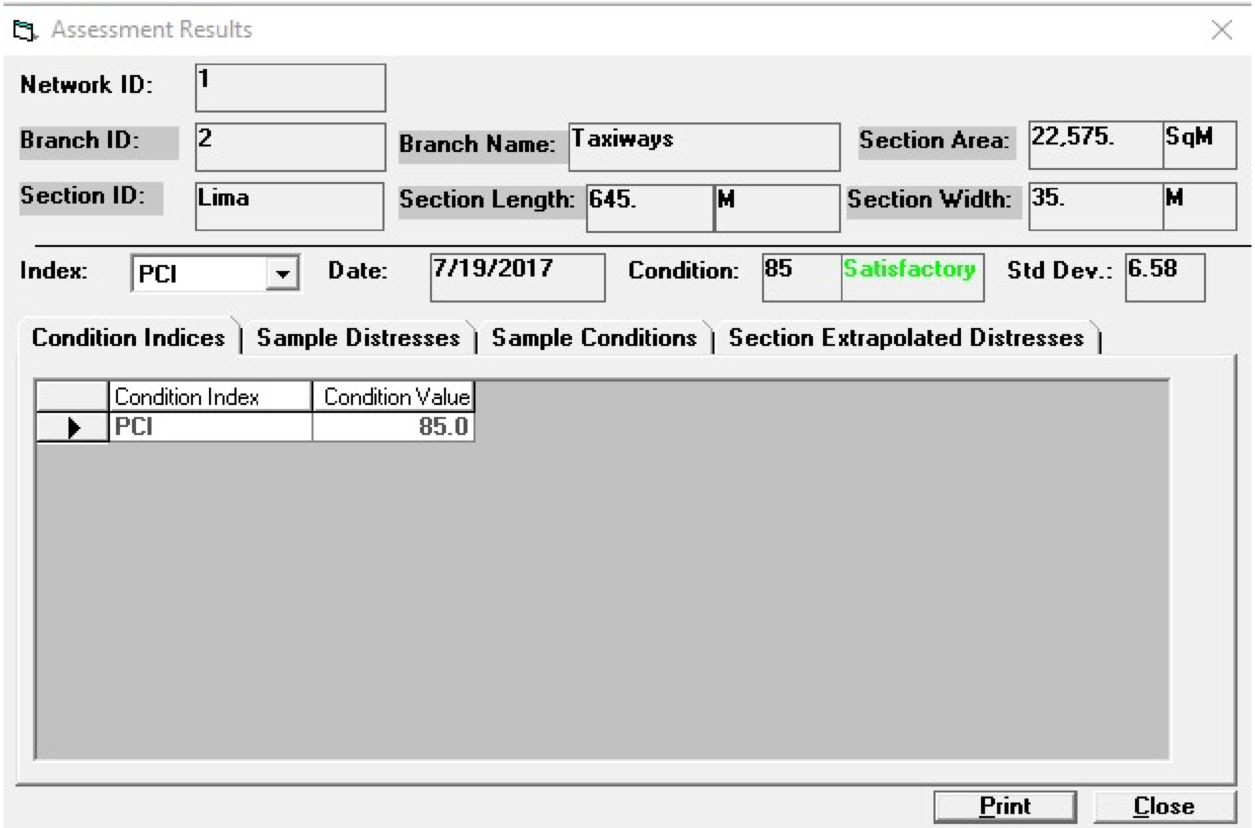

Assessment Results
Network ID: 1
Branch ID: 2
Branch Name: Taxiways
Section Area: 29,700. SqM
Section ID: Foxtrot
Section Length: 990. M
Section Width: 30. M
Index: PCI
Date: 7/29/2017
Condition: 13 Serious
Std Dev.: 10.27
Condition Indices
Sample Distresses
Sample Conditions
Section Extrapolated Distresses
Condition Index
Condition Value
PCI
13.0
Print
Close

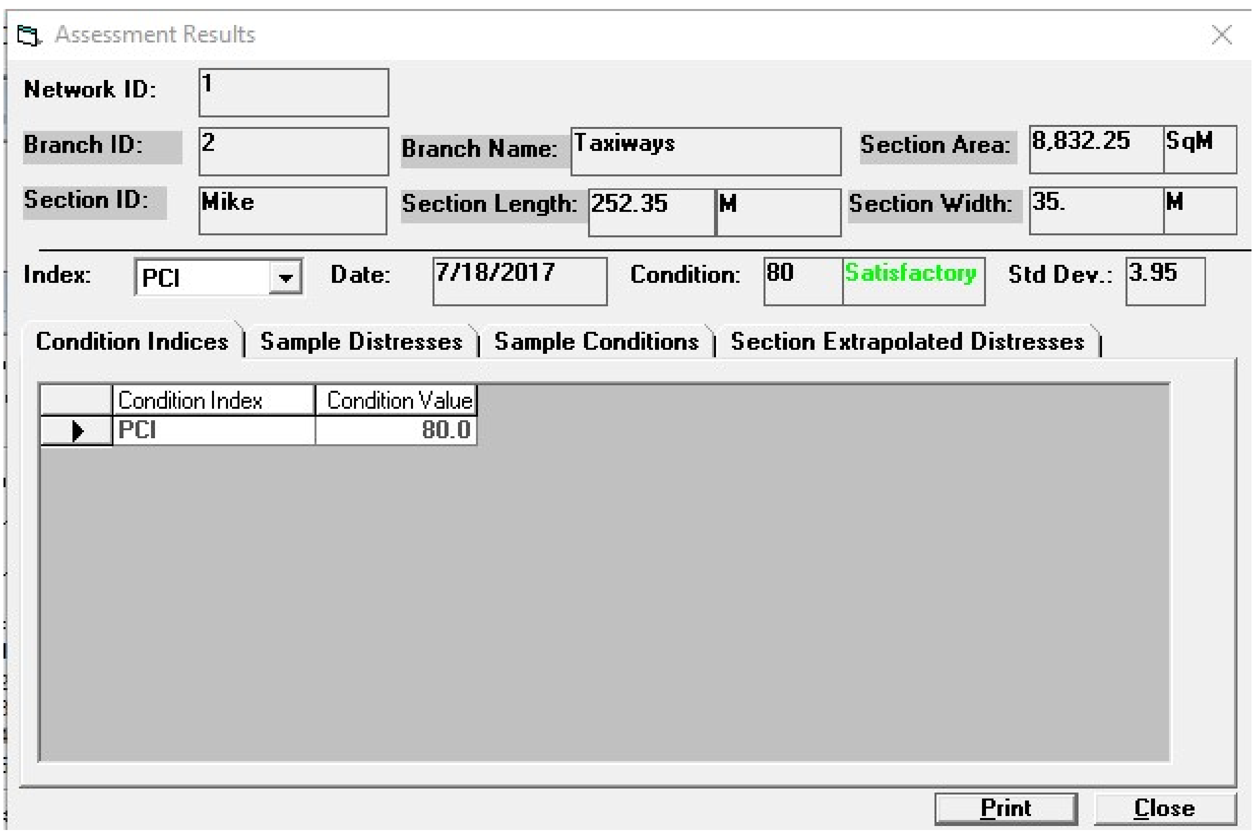

Assessment Results
Network ID: 1
Branch ID: 2
Branch Name: Taxiways
Section Area: 29,700. SqM
Section ID: Golf
Section Length: 990. M
Section Width: 30. M
Index: PCI
Date: 8/1/2017
Condition: 3 Failed
Std Dev.: 4.06
Condition Indices
Sample Distresses
Sample Conditions
Section Extrapolated Distresses
Condition Index
Condition Value
PCI
3.0
Print
Close

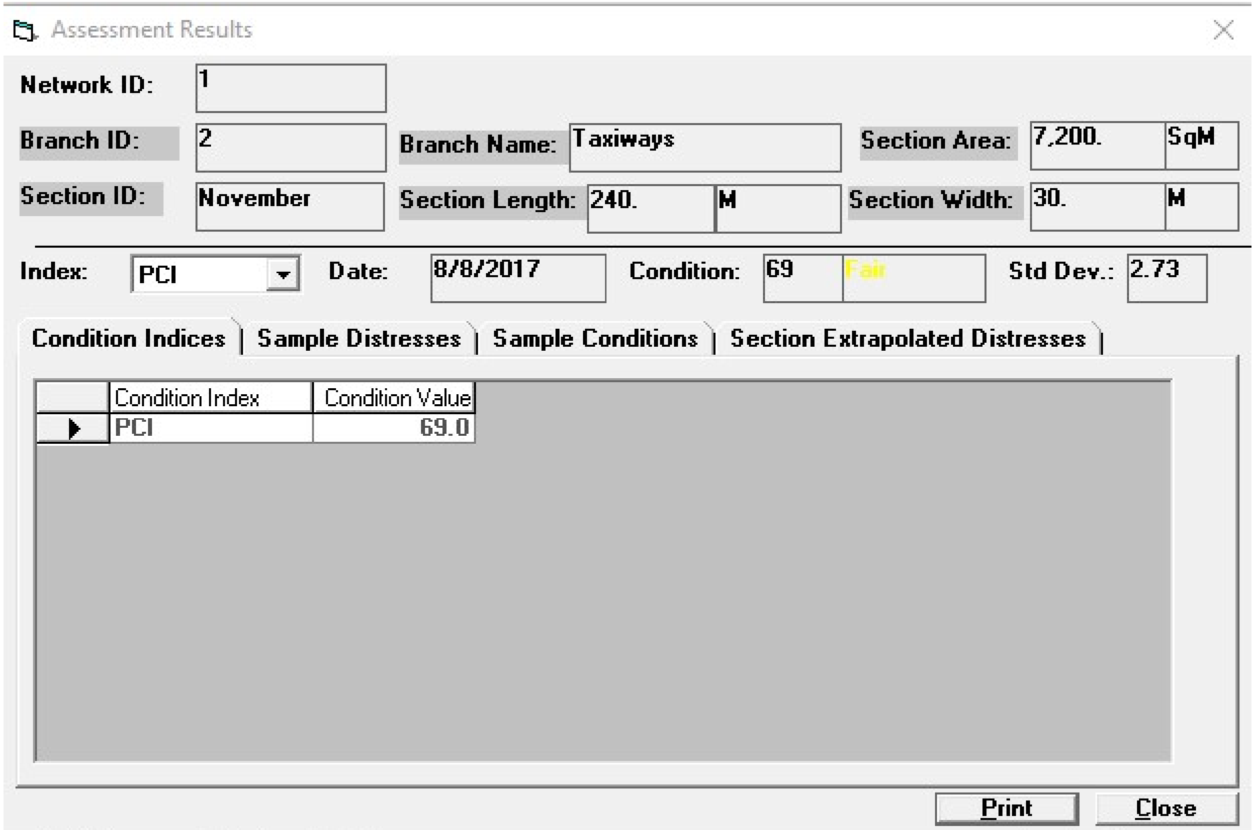

Assessment Results
Network ID: 1
Branch ID: 2
Branch Name: Taxiways
Section Area: 145,089. SqM
Section ID: Hotel
Section Length: 4,145.4 M
Section Width: 35. M
Index: PCI
Date: 7/16/2017
Condition: 88 Good
Std Dev.: 7.17
Condition Indices
Sample Distresses
Sample Conditions
Section Extrapolated Distresses
Condition Index
Condition Value
PCI
88.0
Print
Close

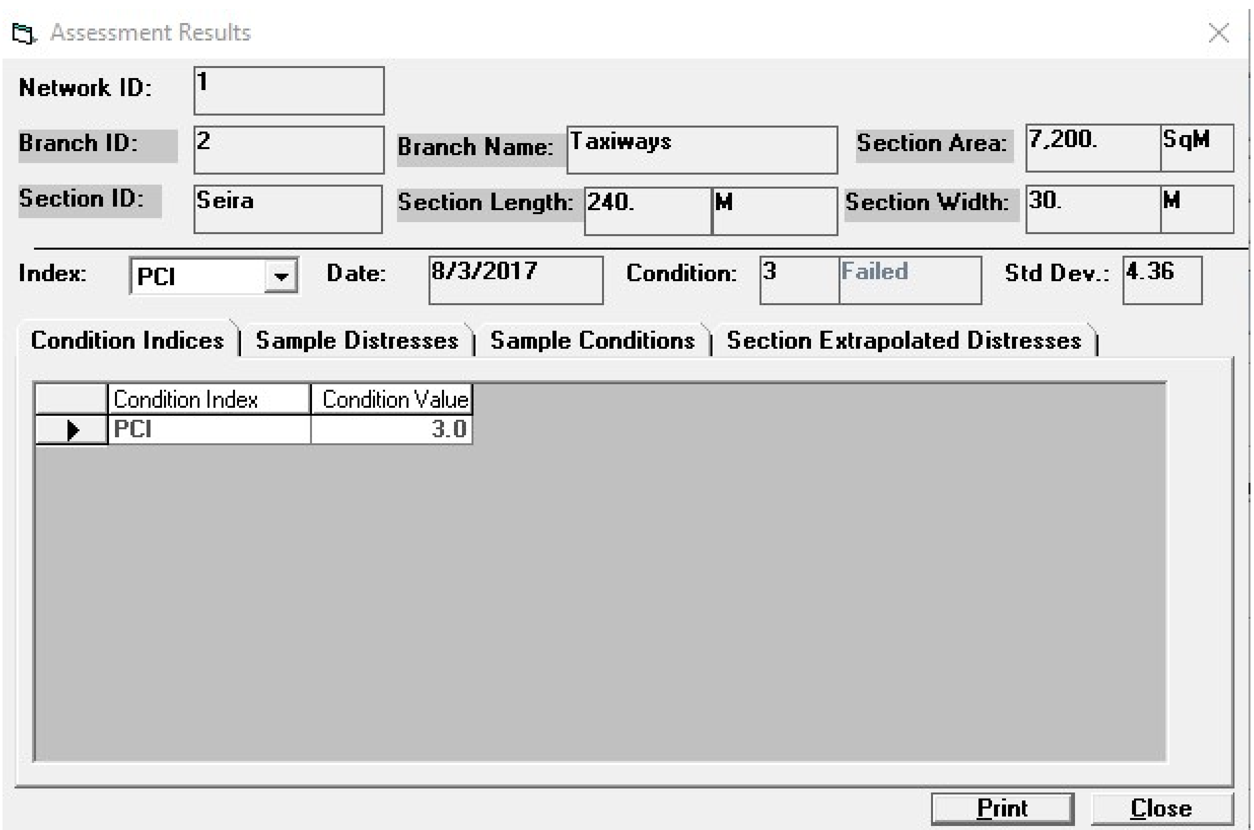

Assessment Results
Network ID: 1
Branch ID: 2
Branch Name: Taxiways
Section Area: 3,360. SqM
Section ID: Juliet
Section Length: 96. M
Section Width: 35. M
Index: PCI
Date: 7/30/2017
Condition: 92 Good
Std Dev.: 1.24
Condition Indices
Sample Distresses
Sample Conditions
Section Extrapolated Distresses
Condition Index
Condition Value
PCI
92.0
Print
Close

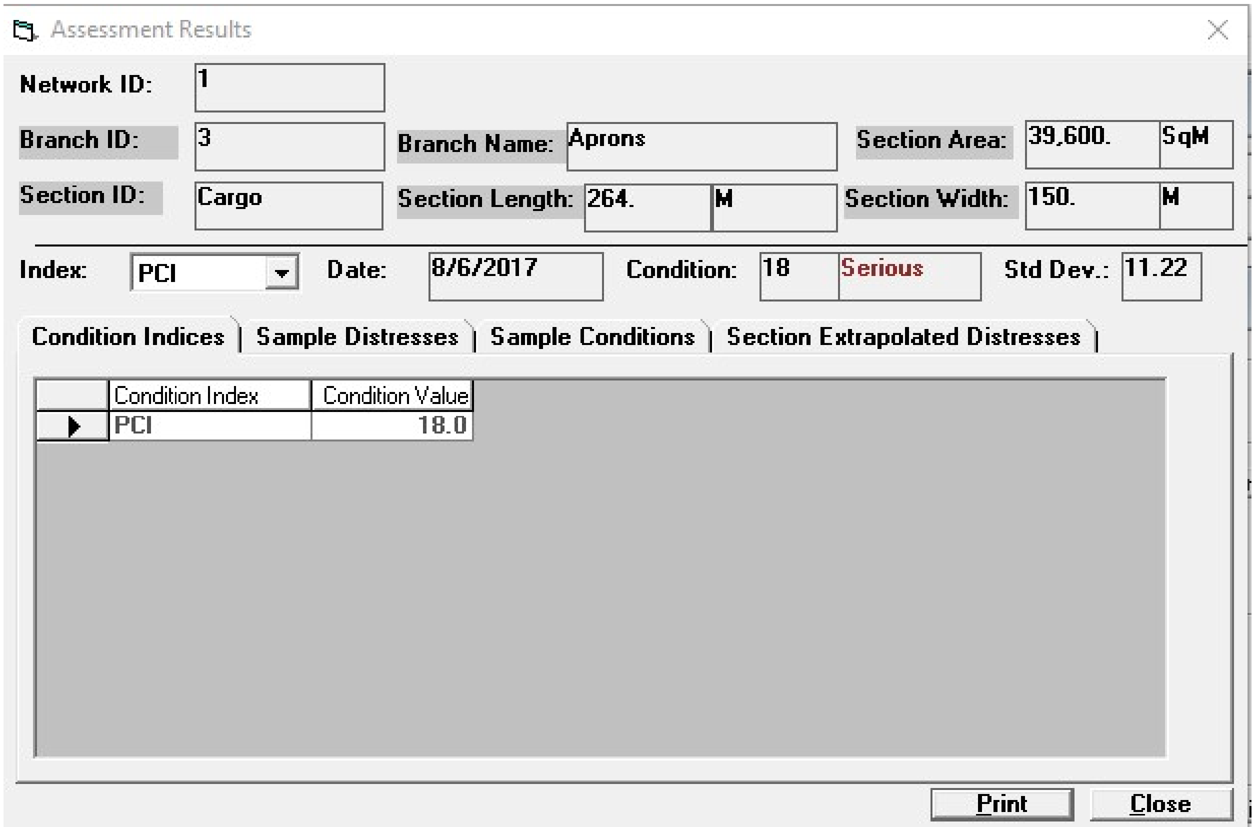

Assessment Results
Network ID: 1
Branch ID: 2
Branch Name: Taxiways
Section Area: 22,575. SqM
Section ID: Kilo
Section Length: 645. M
Section Width: 35. M
Index: PCI
Date: 7/22/2017
Condition: 79 Satisfactory
Std Dev.: 6.96
Condition Indices
Sample Distresses
Sample Conditions
Section Extrapolated Distresses
Condition Index
Condition Value
PCI
79.0
Print
Close

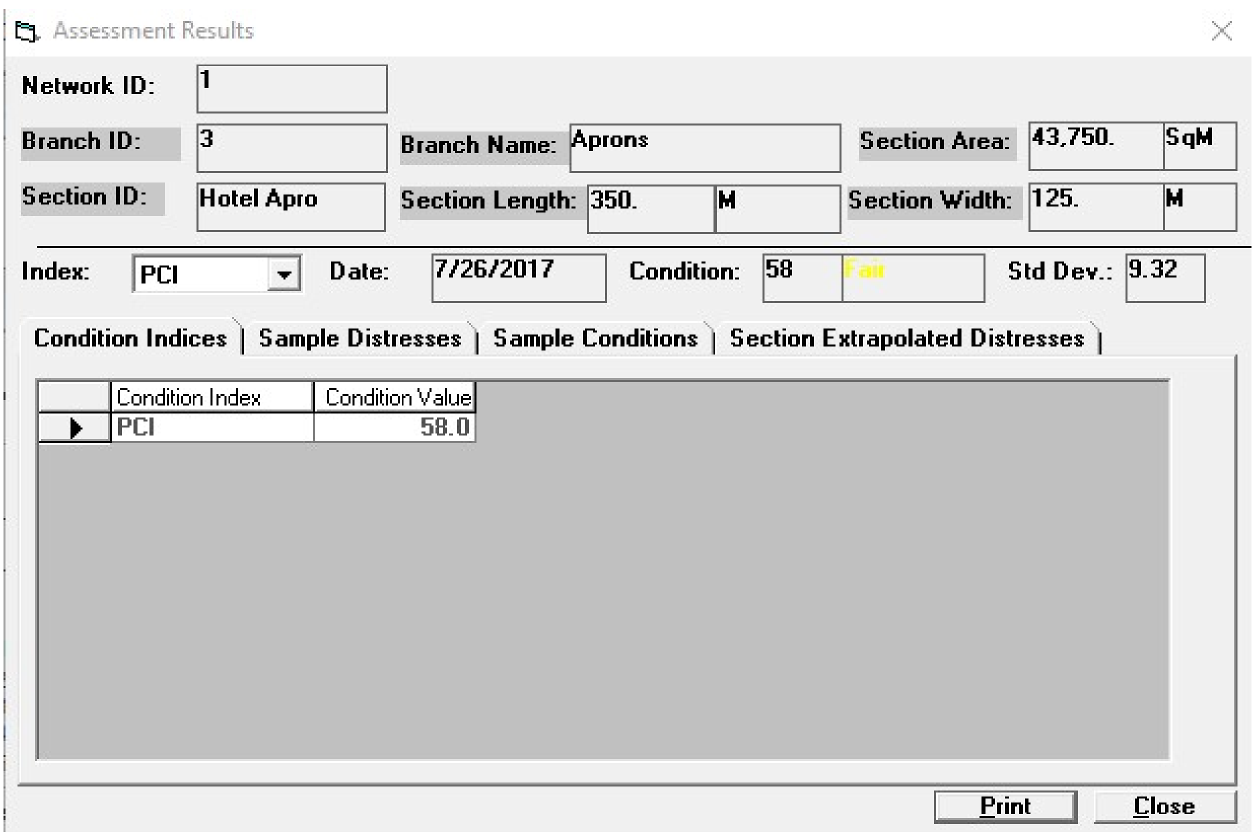

Assessment Results
Network ID:
1
Branch ID:
2
Branch Name:
Taxiways
Section Area:
22,575.
SqM
Section ID:
Lima
Section Length:
645.
M
Section Width:
35.
M
Index:
PCI
Date:
7/19/2017
Condition:
85
Satisfactory
Std Dev.:
6.58
Condition Indices
Sample Distresses
Sample Conditions
Section Extrapolated Distresses
Condition Index
Condition Value
PCI
85.0
Print
Close

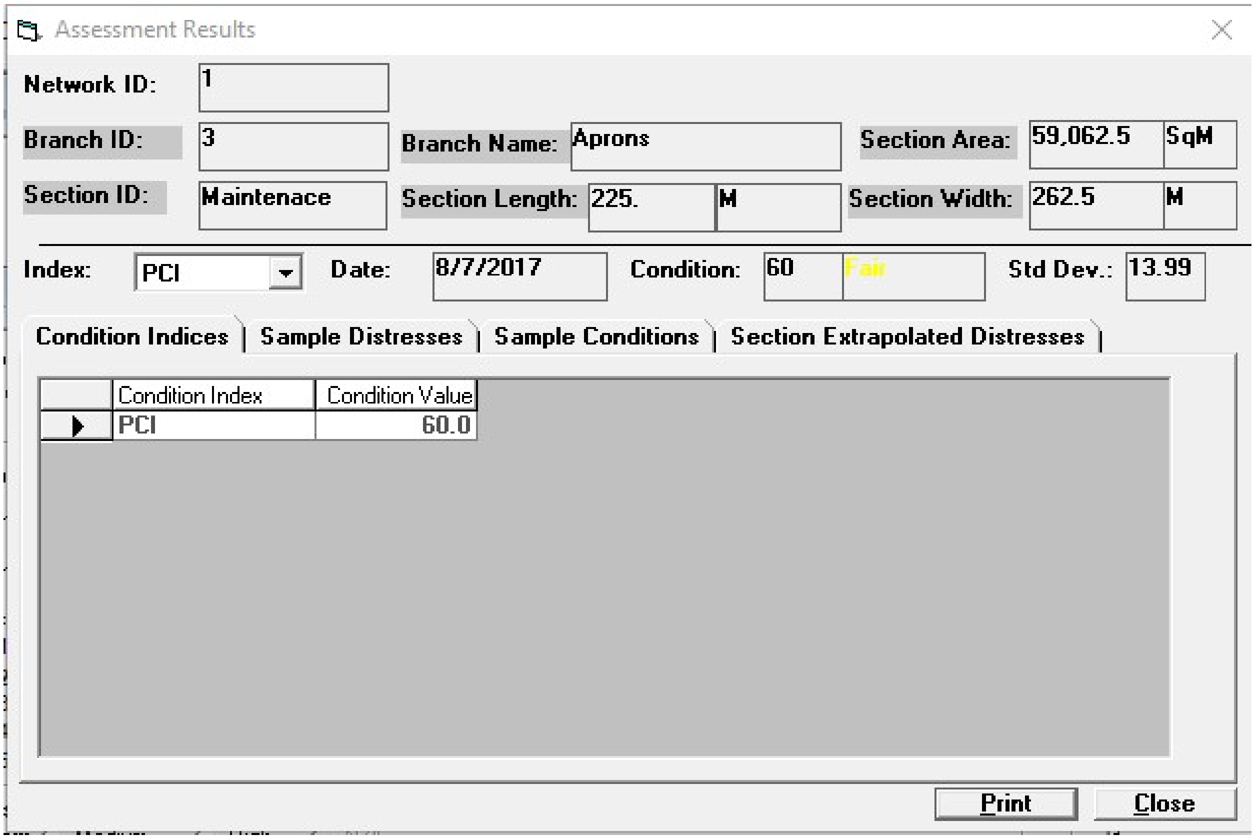

Assessment Results
Network ID:
1
Branch ID:
2
Branch Name:
Taxiways
Section Area:
8,832.25
SqM
Section ID:
Mike
Section Length:
252.35
M
Section Width:
35.
M
Index:
PCI
Date:
7/18/2017
Condition:
80
Satisfactory
Std Dev.:
3.95
Condition Indices
Sample Distresses
Sample Conditions
Section Extrapolated Distresses
Condition Index
Condition Value
PCI
80.0
Print
Close

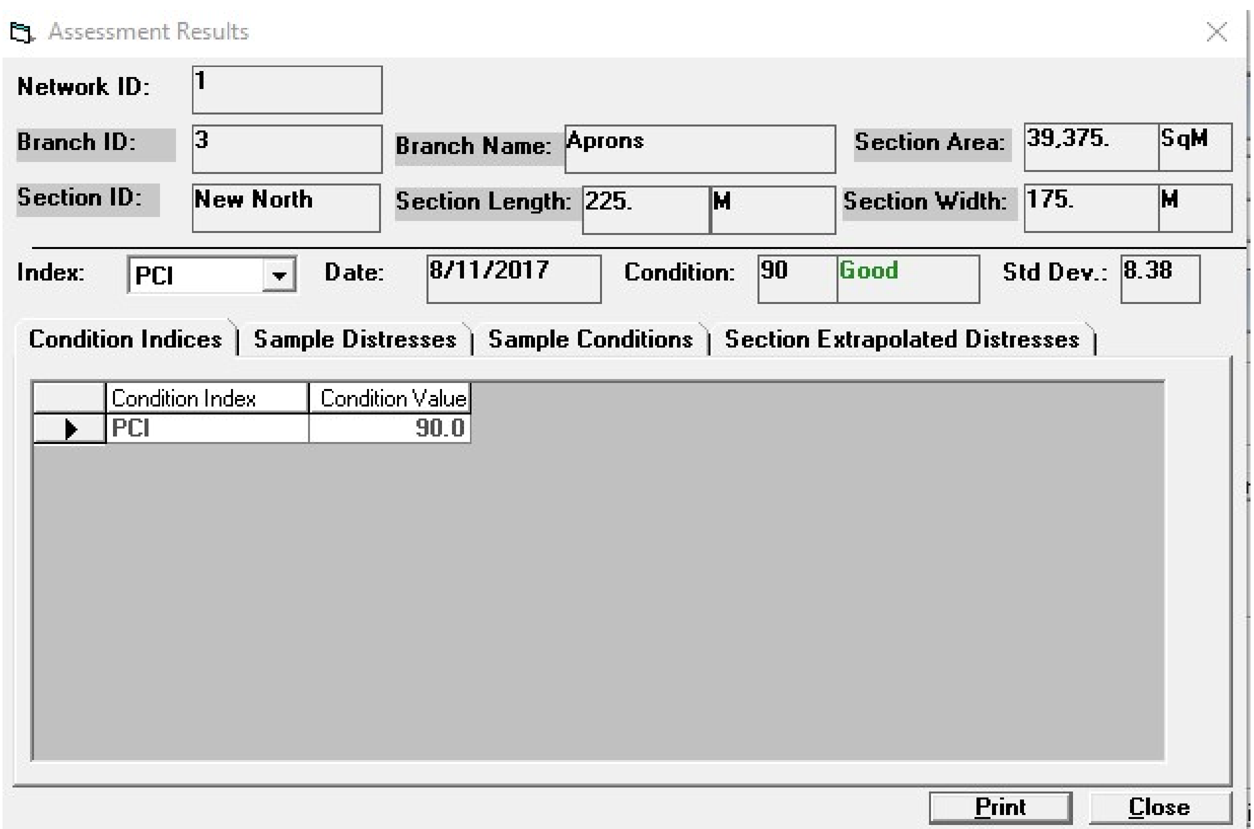

Assessment Results
Network ID: 1
Branch ID: 2
Branch Name: Taxiways
Section Area: 7,200. SqM
Section ID: November
Section Length: 240. M
Section Width: 30. M
Index: PCI
Date: 8/8/2017
Condition: 69 Fair
Std Dev.: 2.73
Condition Indices
Sample Distresses
Sample Conditions
Section Extrapolated Distresses
Condition Index
Condition Value
PCI
69.0
Print
Close

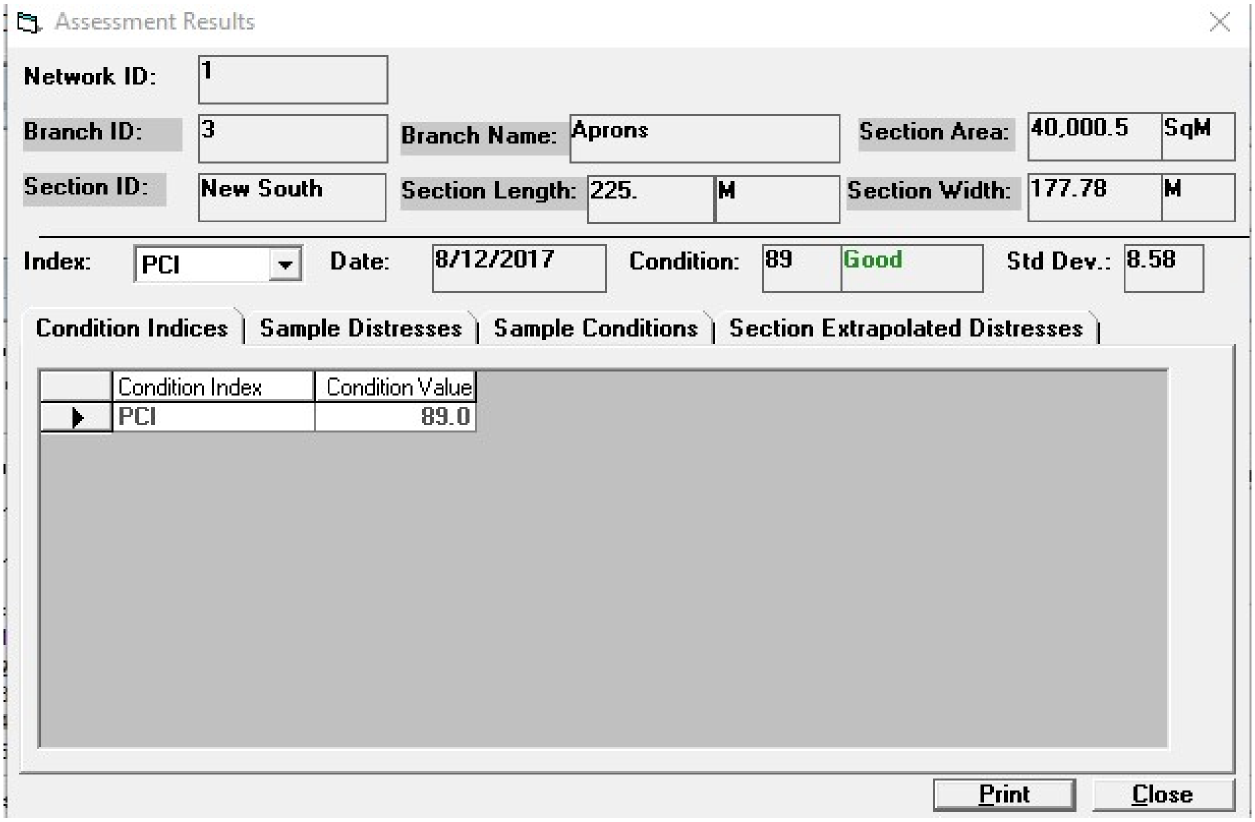

Assessment Results
Network ID: 1
Branch ID: 2
Branch Name: Taxiways
Section Area: 7,200. SqM
Section ID: Seira
Section Length: 240. M
Section Width: 30. M
Index: PCI
Date: 8/3/2017
Condition: 3 Failed
Std Dev.: 4.36
Condition Indices
Sample Distresses
Sample Conditions
Section Extrapolated Distresses
Condition Index
Condition Value
PCI
3.0
Print
Close

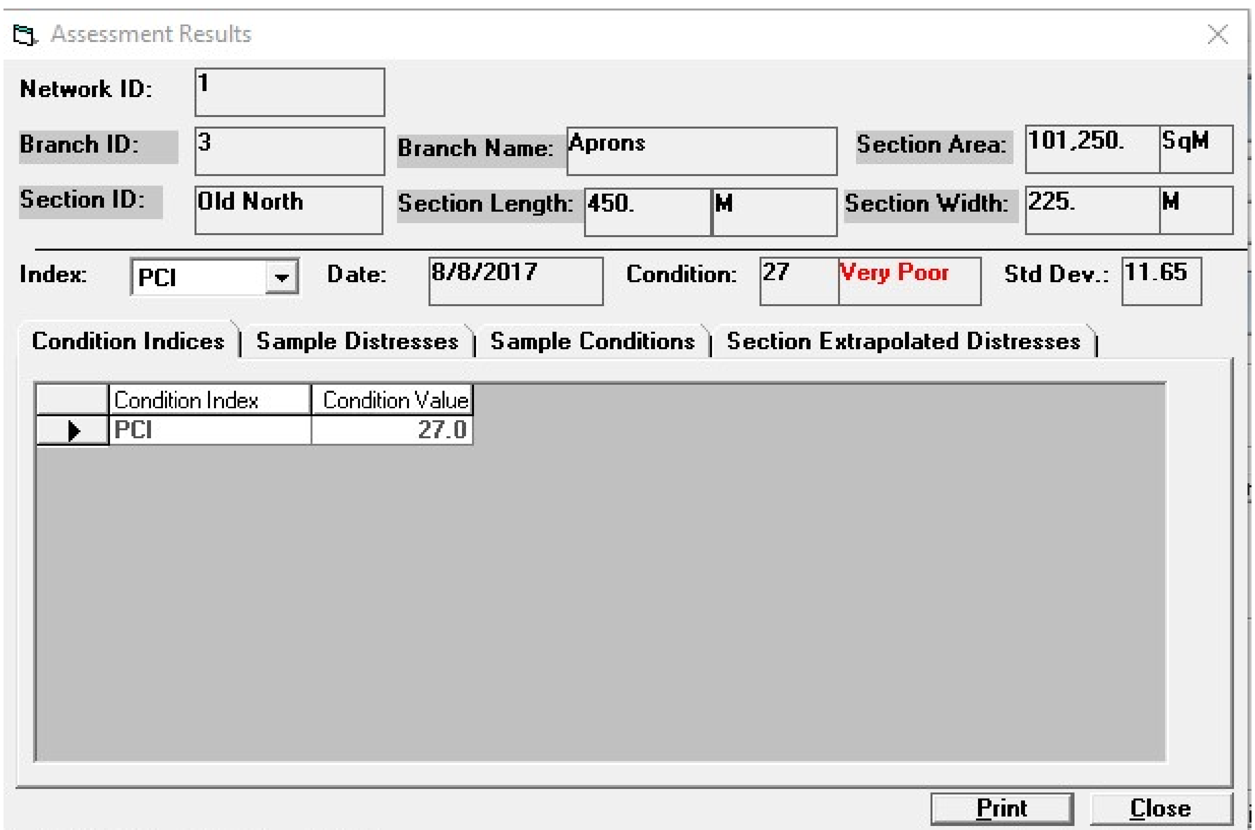

Assessment Results
Network ID: 1
Branch ID: 3
Branch Name: Aprons
Section Area: 39,600. SqM
Section ID: Cargo
Section Length: 264. M
Section Width: 150. M
Index: PCI
Date: 8/6/2017
Condition: 18 Serious
Std Dev.: 11.22
Condition Indices
Sample Distresses
Sample Conditions
Section Extrapolated Distresses
Condition Index
Condition Value
PCI 18.0
Print
Close

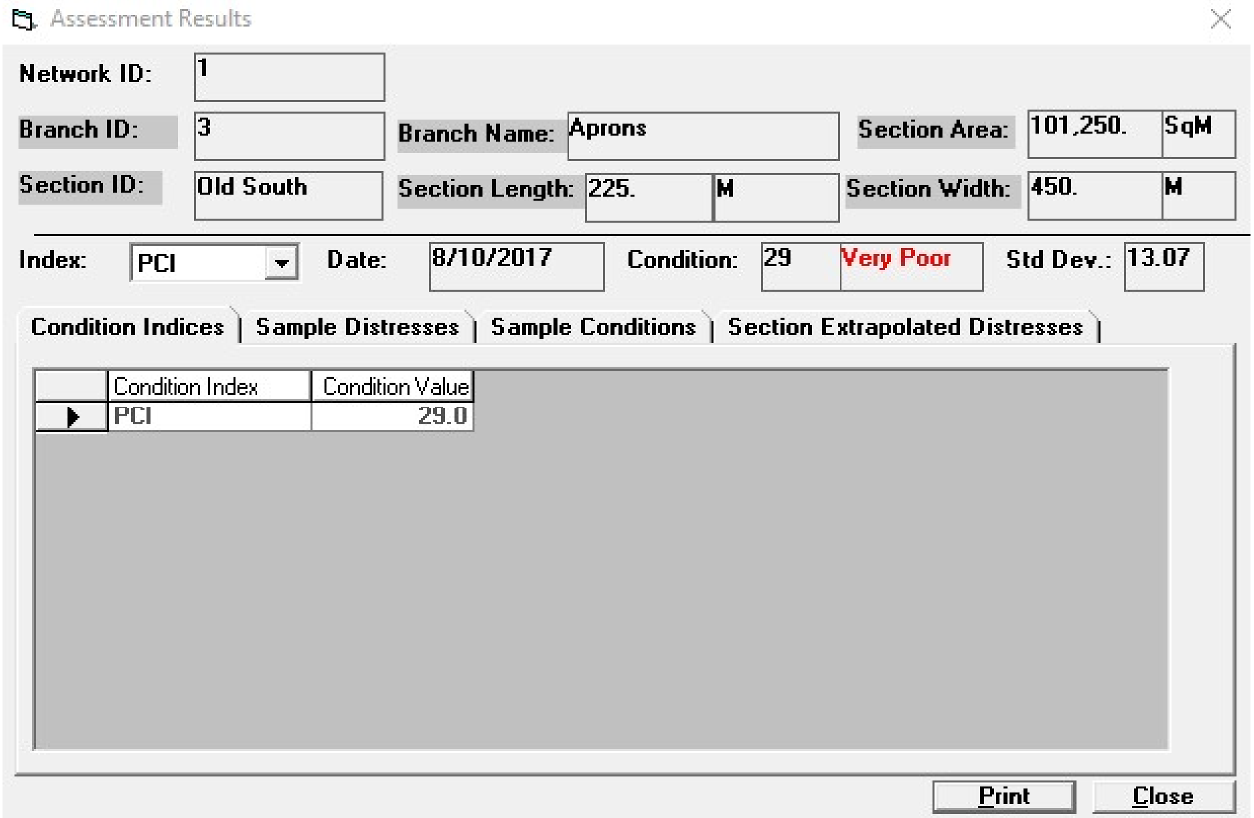

Assessment Results
Network ID: 1
Branch ID: 3
Branch Name: Aprons
Section Area: 43,750. SqM
Section ID: Hotel Apro
Section Length: 350. M
Section Width: 125. M
Index: PCI
Date: 7/26/2017
Condition: 58 Fair
Std Dev.: 9.32
Condition Indices
Sample Distresses
Sample Conditions
Section Extrapolated Distresses
Condition Index
Condition Value
PCI 58.0
Print
Close


Assessment Results
Network ID: 1
Branch ID: 3
Branch Name: Aprons
Section Area: 59,062.5 SqM
Section ID: Maintenace
Section Length: 225. M
Section Width: 262.5 M
Index: PCI
Date: 8/7/2017
Condition: 60 Fair
Std Dev.: 13.99
Condition Indices
Sample Distresses
Sample Conditions
Section Extrapolated Distresses
Condition Index
Condition Value
PCI
60.0
Print
Close


Assessment Results
Network ID: 1
Branch ID: 3
Branch Name: Aprons
Section Area: 39,375. SqM
Section ID: New North
Section Length: 225. M
Section Width: 175. M
Index: PCI
Date: 8/11/2017
Condition: 90 Good
Std Dev.: 8.38
Condition Indices
Sample Distresses
Sample Conditions
Section Extrapolated Distresses
Condition Index
Condition Value
PCI
90.0
Print
Close


Assessment Results
Network ID: 1
Branch ID: 3
Branch Name: Aprons
Section Area: 40,000.5 SqM
Section ID: New South
Section Length: 225. M
Section Width: 177.78 M
Index: PCI
Date: 8/12/2017
Condition: 89 Good
Std Dev.: 8.58
Condition Indices
Sample Distresses
Sample Conditions
Section Extrapolated Distresses
Condition Index
Condition Value
PCI
89.0
Print
Close

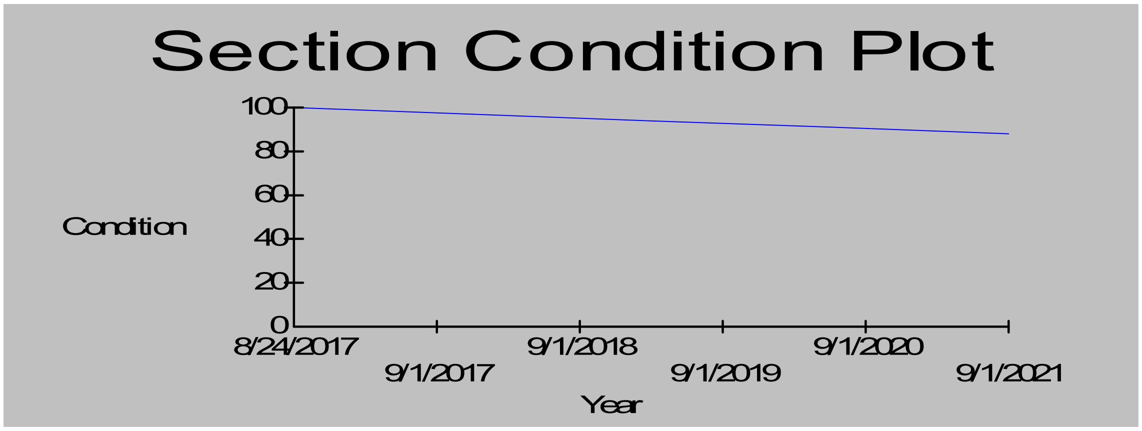

Assessment Results
Network ID: 1
Branch ID: 3
Branch Name: Aprons
Section Area: 101,250. SqM
Section ID: Old North
Section Length: 450. M
Section Width: 225. M
Index: PCI
Date: 8/8/2017
Condition: 27 Very Poor
Std Dev.: 11.65
Condition Indices
Sample Distresses
Sample Conditions
Section Extrapolated Distresses
Condition Index
Condition Value
PCI
27.0
Print
Close


Assessment Results
Network ID: 1
Branch ID: 3
Branch Name: Aprons
Section Area: 101,250. SqM
Section ID: Old South
Section Length: 225. M
Section Width: 450. M
Index: PCI
Date: 8/10/2017
Condition: 29 Very Poor
Std Dev.: 13.07
Condition Indices
Sample Distresses
Sample Conditions
Section Extrapolated Distresses
Condition Index
Condition Value
PCI
29.0
Print
Close

Appendix D

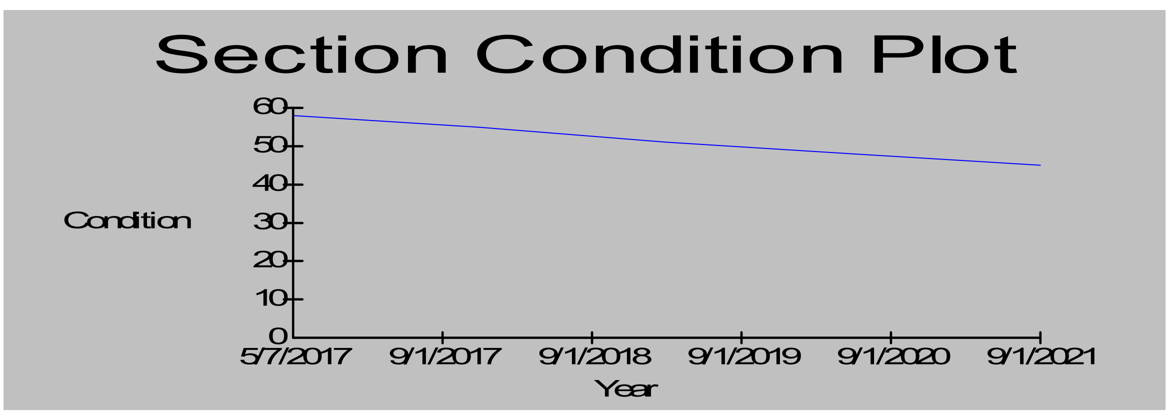
Future Prediction of PCI Value

North RWY



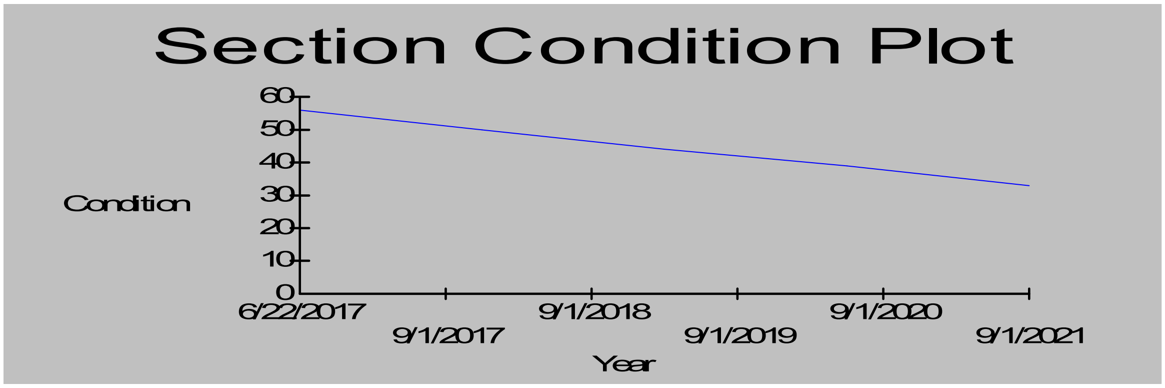
Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
1	2	8/24/2017	Inspection	100	1	Good	219,600.00
1	2	9/1/2017	Prediction	100	1	Good	219,600.00
1	2	9/1/2018	Prediction	97	2	Good	219,600.00
1	2	9/1/2019	Prediction	94	3	Good	219,600.00
1	2	9/1/2020	Prediction	91	4	Good	219,600.00
1	2	9/1/2021	Prediction	88	5	Good	219,600.00

South RWY



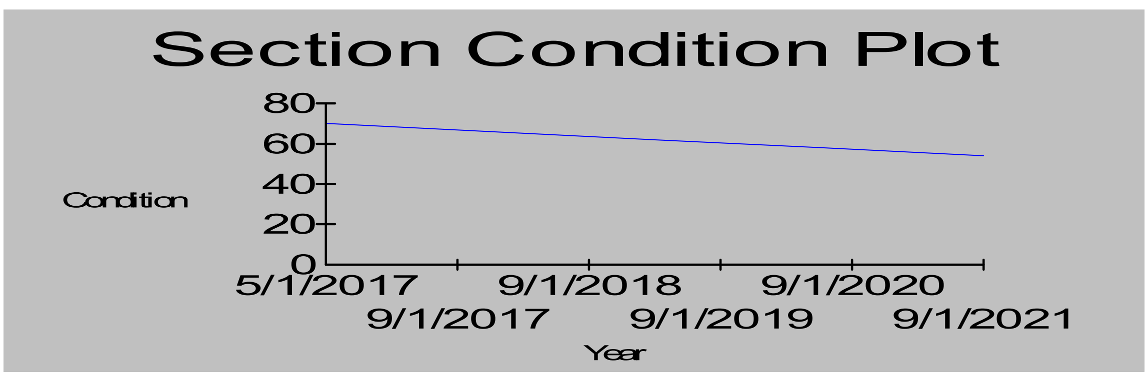
Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
1	1	5/7/2017	Inspection	59	12	Fair	219,600.00
1	1	9/1/2017	Prediction	58	13	Fair	219,600.00
1	1	9/1/2018	Prediction	55	14	Poor	219,600.00
1	1	9/1/2019	Prediction	51	15	Poor	219,600.00
1	1	9/1/2020	Prediction	48	16	Poor	219,600.00
1	1	9/1/2021	Prediction	45	17	Poor	219,600.00

Alpha TWY



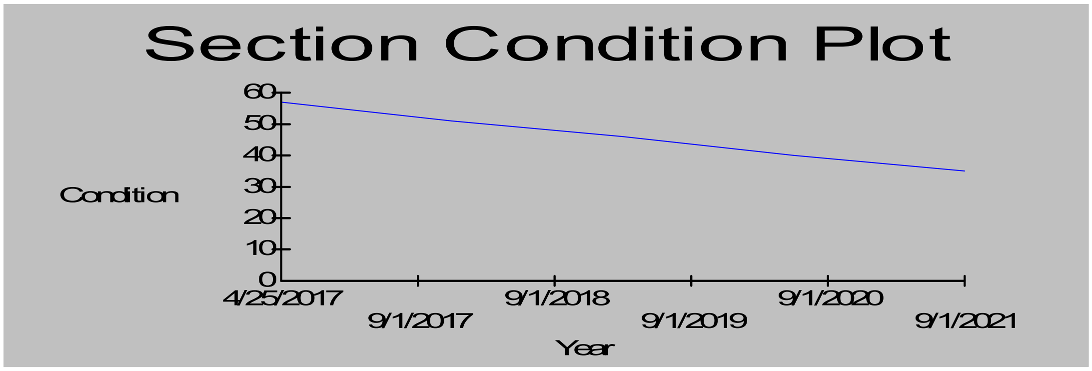
Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
2	Alpha	6/22/2017	Inspection	57	7	Fair	145,089.00
2	Alpha	9/1/2017	Prediction	56	8	Fair	145,089.00
2	Alpha	9/1/2018	Prediction	50	9	Poor	145,089.00
2	Alpha	9/1/2019	Prediction	44	10	Poor	145,089.00
2	Alpha	9/1/2020	Prediction	39	11	Very Poor	145,089.00
2	Alpha	9/1/2021	Prediction	33	12	Very Poor	145,089.00

Bravo TWY



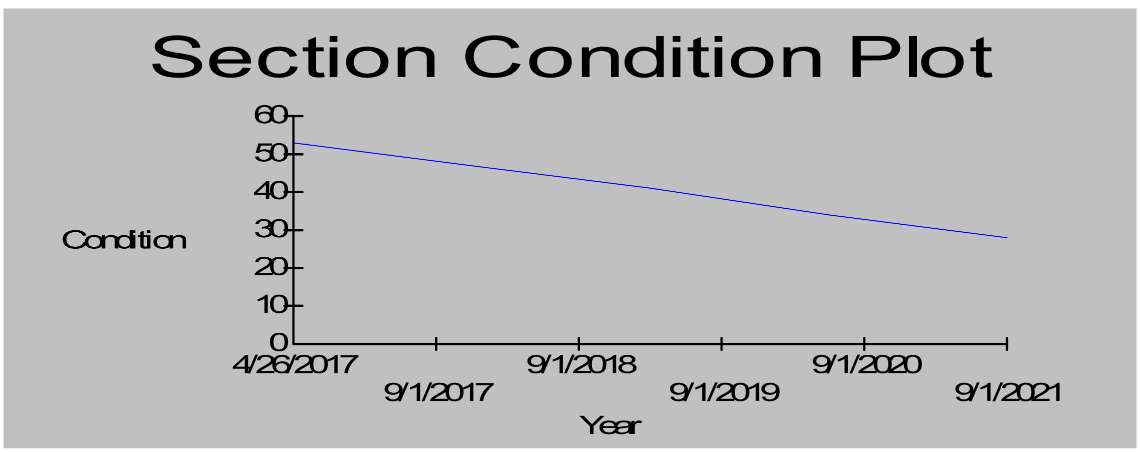
Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
2	Bravo	5/1/2017	Inspection	71	7	Satisfactory	8,832.25
2	Bravo	9/1/2017	Prediction	70	8	Fair	8,832.25
2	Bravo	9/1/2018	Prediction	66	9	Fair	8,832.25
2	Bravo	9/1/2019	Prediction	62	10	Fair	8,832.25
2	Bravo	9/1/2020	Prediction	58	11	Fair	8,832.25
2	Bravo	9/1/2021	Prediction	54	12	Poor	8,832.25

Charli TWY



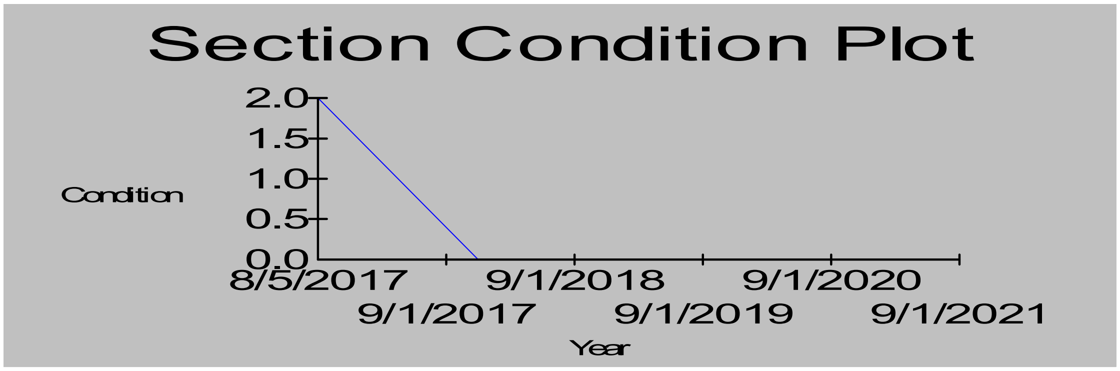
Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
2	Charli	4/25/2017	Inspection	59	7	Fair	22,575.00
2	Charli	9/1/2017	Prediction	57	8	Fair	22,575.00
2	Charli	9/1/2018	Prediction	51	9	Poor	22,575.00
2	Charli	9/1/2019	Prediction	46	10	Poor	22,575.00
2	Charli	9/1/2020	Prediction	40	11	Very Poor	22,575.00
2	Charli	9/1/2021	Prediction	35	12	Very Poor	22,575.00

Delta TWY



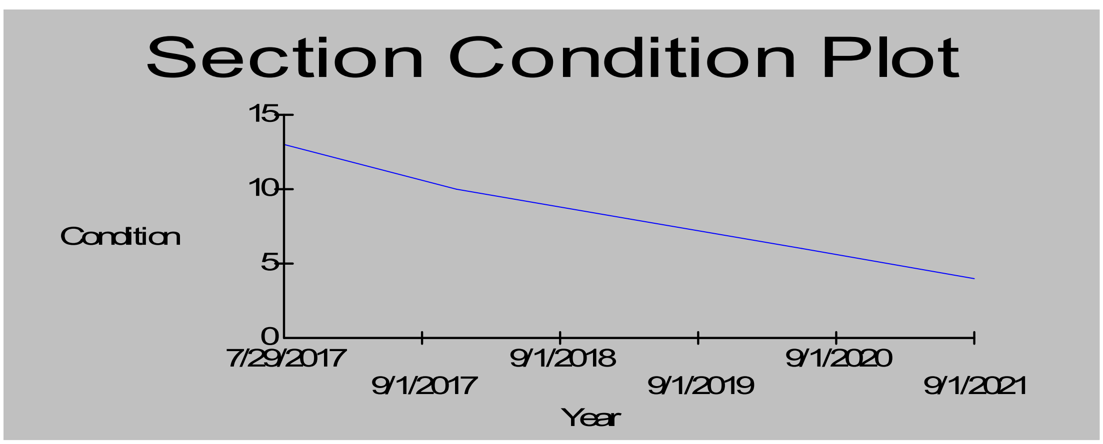
Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
2	Delta	4/26/2017	Inspection	55	7	Poor	22,575.00
2	Delta	9/1/2017	Prediction	53	8	Poor	22,575.00
2	Delta	9/1/2018	Prediction	47	9	Poor	22,575.00
2	Delta	9/1/2019	Prediction	41	10	Poor	22,575.00
2	Delta	9/1/2020	Prediction	34	11	Very Poor	22,575.00
2	Delta	9/1/2021	Prediction	28	12	Very Poor	22,575.00

Eco TWY



Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
2	Eco	8/5/2017	Inspection	2	38	Failed	4,050.00
2	Eco	9/1/2017	Prediction	2	38	Failed	4,050.00
2	Eco	9/1/2018	Prediction	0	39	Failed	4,050.00
2	Eco	9/1/2019	Prediction	0	40	Failed	4,050.00
2	Eco	9/1/2020	Prediction	0	41	Failed	4,050.00
2	Eco	9/1/2021	Prediction	0	42	Failed	4,050.00

Fox TWY

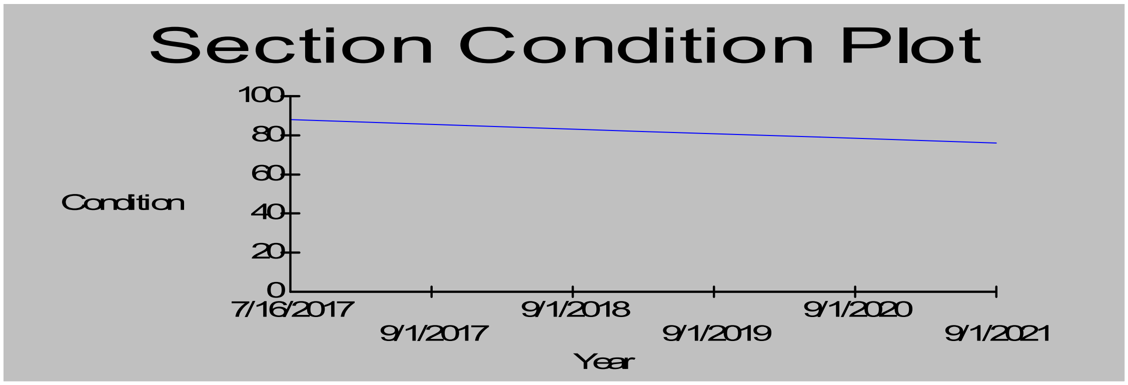


Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
2	Foxtrot	7/29/2017	Inspection	13	38	Serious	29,700.00
2	Foxtrot	9/1/2017	Prediction	13	38	Serious	29,700.00
2	Foxtrot	9/1/2018	Prediction	10	39	Failed	29,700.00
2	Foxtrot	9/1/2019	Prediction	8	40	Failed	29,700.00
2	Foxtrot	9/1/2020	Prediction	6	41	Failed	29,700.00
2	Foxtrot	9/1/2021	Prediction	4	42	Failed	29,700.00

Golf TWY

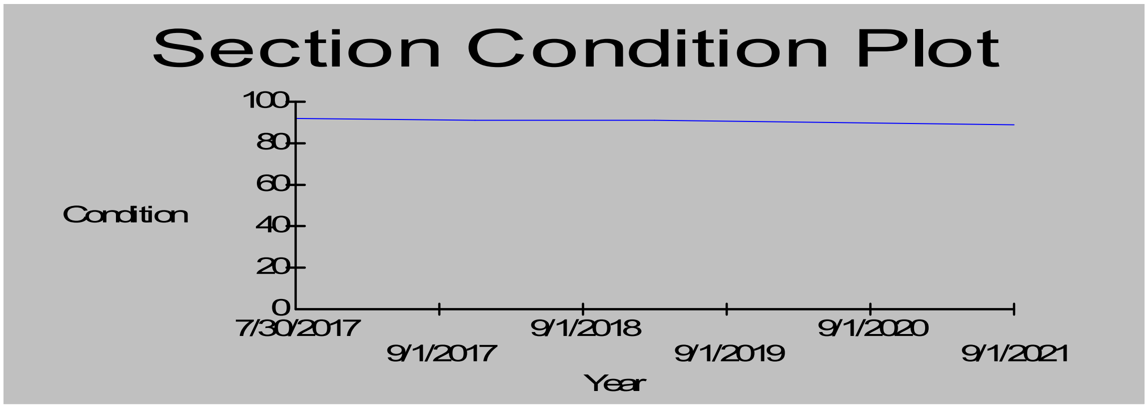
Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
2	Golf	8/1/2017	Inspection	3	38	Failed	29,700.00
2	Golf	9/1/2017	Prediction	3	38	Failed	29,700.00
2	Golf	9/1/2018	Prediction	0	39	Failed	29,700.00
2	Golf	9/1/2019	Prediction	0	40	Failed	29,700.00
2	Golf	9/1/2020	Prediction	0	41	Failed	29,700.00
2	Golf	9/1/2021	Prediction	0	42	Failed	29,700.00

Hotel TWY



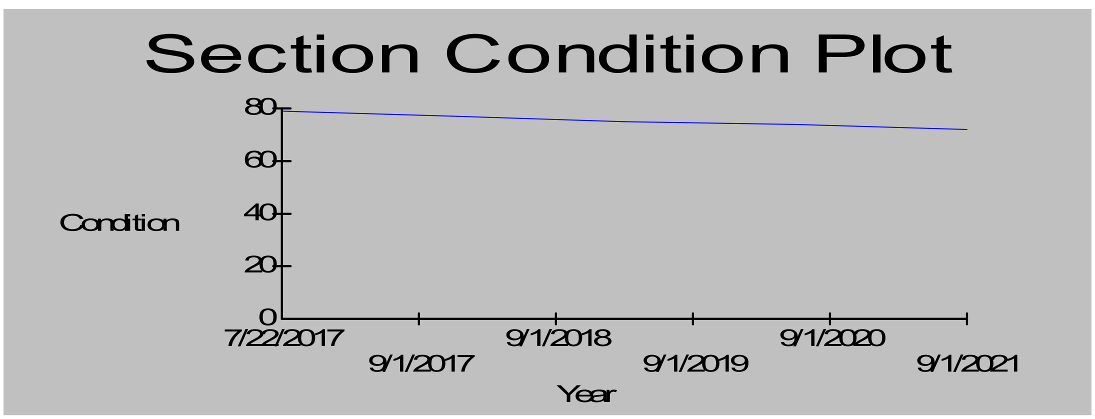
Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
2	Hotel	7/16/2017	Inspection	88	2	Good	145,089.00
2	Hotel	9/1/2017	Prediction	88	2	Good	145,089.00
2	Hotel	9/1/2018	Prediction	85	3	Satisfactory	145,089.00
2	Hotel	9/1/2019	Prediction	82	4	Satisfactory	145,089.00
2	Hotel	9/1/2020	Prediction	79	5	Satisfactory	145,089.00
2	Hotel	9/1/2021	Prediction	76	6	Satisfactory	145,089.00

Juliet TWY



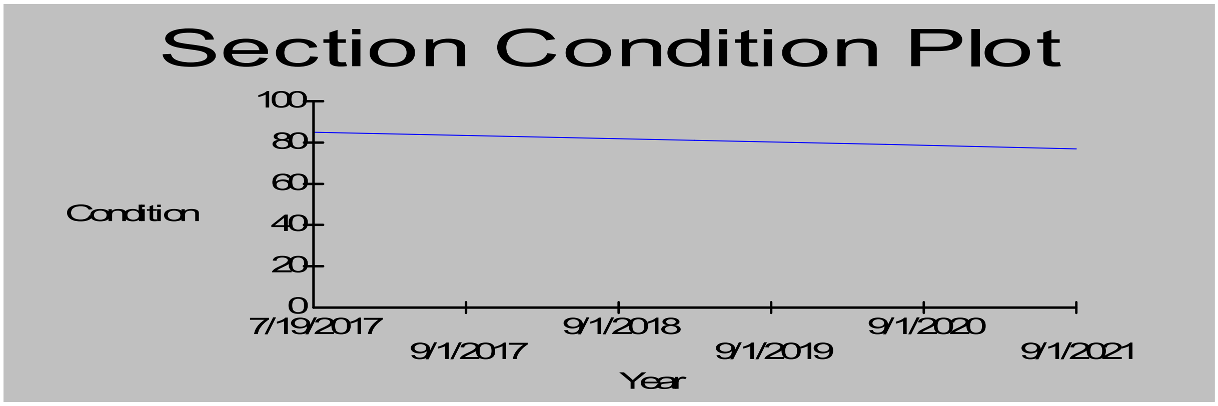
Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
2	Juliet	7/30/2017	Inspection	92	13	Good	3,360.00
2	Juliet	9/1/2017	Prediction	92	13	Good	3,360.00
2	Juliet	9/1/2018	Prediction	91	14	Good	3,360.00
2	Juliet	9/1/2019	Prediction	91	15	Good	3,360.00
2	Juliet	9/1/2020	Prediction	90	16	Good	3,360.00
2	Juliet	9/1/2021	Prediction	89	17	Good	3,360.00

Kilo TWY



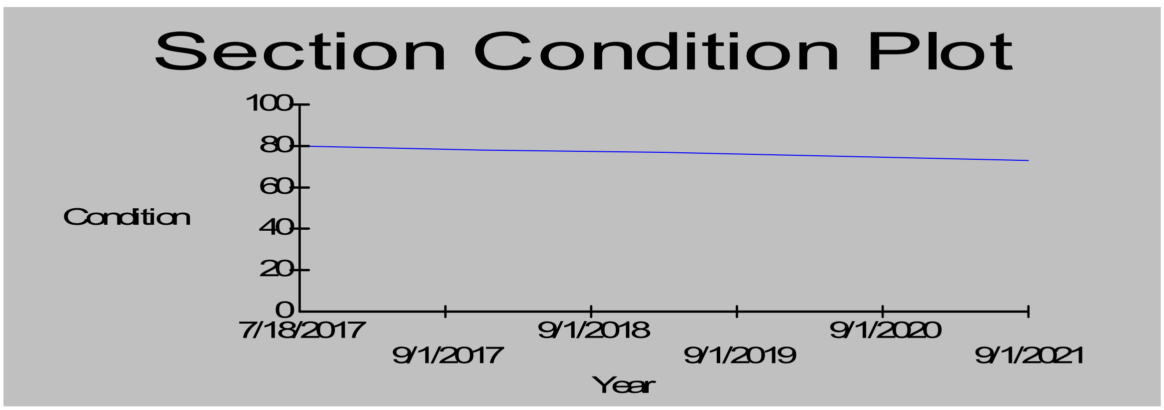
Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
2	Kilo	7/22/2017	Inspection	79	13	Satisfactory	22,575.00
2	Kilo	9/1/2017	Prediction	79	13	Satisfactory	22,575.00
2	Kilo	9/1/2018	Prediction	77	14	Satisfactory	22,575.00
2	Kilo	9/1/2019	Prediction	75	15	Satisfactory	22,575.00
2	Kilo	9/1/2020	Prediction	74	16	Satisfactory	22,575.00
2	Kilo	9/1/2021	Prediction	72	17	Satisfactory	22,575.00

Lima TWY



Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
2	Lima	7/19/2017	Inspection	85	8	Satisfactory	22,575.00
2	Lima	9/1/2017	Prediction	85	8	Satisfactory	22,575.00
2	Lima	9/1/2018	Prediction	83	9	Satisfactory	22,575.00
2	Lima	9/1/2019	Prediction	81	10	Satisfactory	22,575.00
2	Lima	9/1/2020	Prediction	79	11	Satisfactory	22,575.00
2	Lima	9/1/2021	Prediction	77	12	Satisfactory	22,575.00

Mike TWY

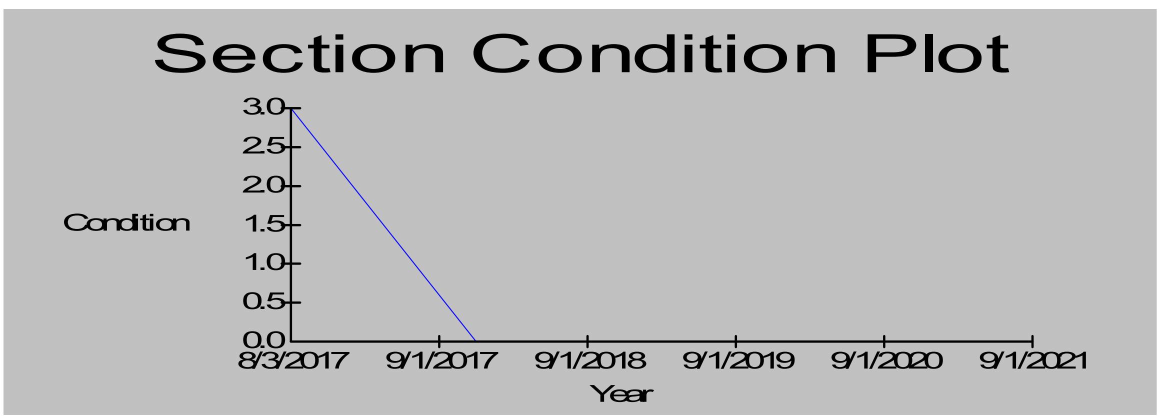


Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
2	Mike	7/18/2017	Inspection	80	13	Satisfactory	8,832.25
2	Mike	9/1/2017	Prediction	80	13	Satisfactory	8,832.25
2	Mike	9/1/2018	Prediction	78	14	Satisfactory	8,832.25
2	Mike	9/1/2019	Prediction	77	15	Satisfactory	8,832.25
2	Mike	9/1/2020	Prediction	75	16	Satisfactory	8,832.25
2	Mike	9/1/2021	Prediction	73	17	Satisfactory	8,832.25

November TWY

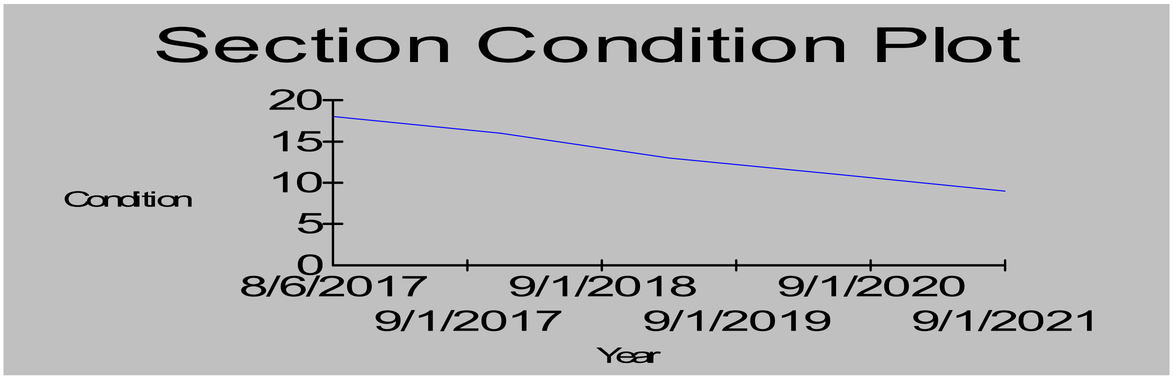
Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
2	November	8/8/2017	Inspection	69	38	Fair	7,200.00
2	November	9/1/2017	Prediction	69	38	Fair	7,200.00
2	November	9/1/2018	Prediction	68	39	Fair	7,200.00
2	November	9/1/2019	Prediction	67	40	Fair	7,200.00
2	November	9/1/2020	Prediction	66	41	Fair	7,200.00
2	November	9/1/2021	Prediction	66	42	Fair	7,200.00

Seira TWY



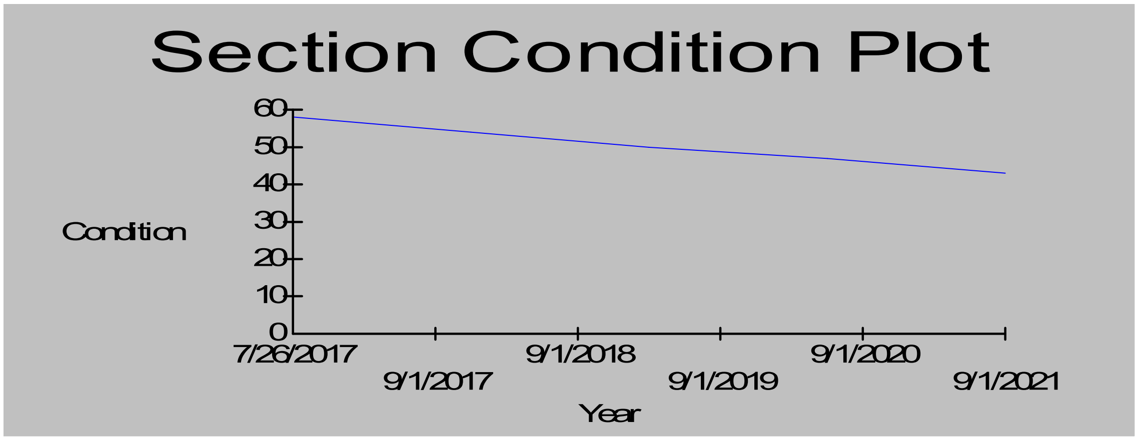
Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
2	Seira	8/3/2017	Inspection	3	38	Failed	7,200.00
2	Seira	9/1/2017	Prediction	3	38	Failed	7,200.00
2	Seira	9/1/2018	Prediction	0	39	Failed	7,200.00
2	Seira	9/1/2019	Prediction	0	40	Failed	7,200.00
2	Seira	9/1/2020	Prediction	0	41	Failed	7,200.00
2	Seira	9/1/2021	Prediction	0	42	Failed	7,200.00

Cargo Apron



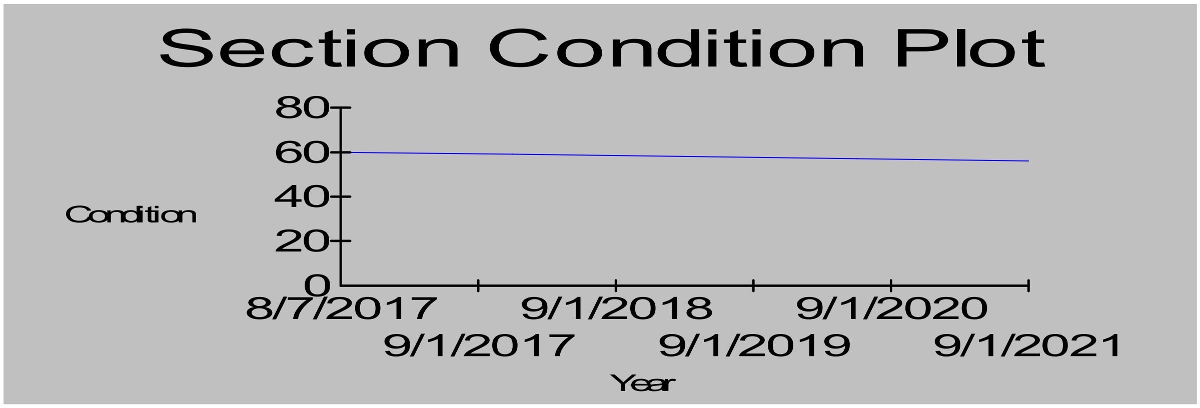
Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
3	Cargo	8/6/2017	Inspection	18	38	Serious	39,600.00
3	Cargo	9/1/2017	Prediction	18	38	Serious	39,600.00
3	Cargo	9/1/2018	Prediction	16	39	Serious	39,600.00
3	Cargo	9/1/2019	Prediction	13	40	Serious	39,600.00
3	Cargo	9/1/2020	Prediction	11	41	Serious	39,600.00
3	Cargo	9/1/2021	Prediction	9	42	Failed	39,600.00

Hotel Apron



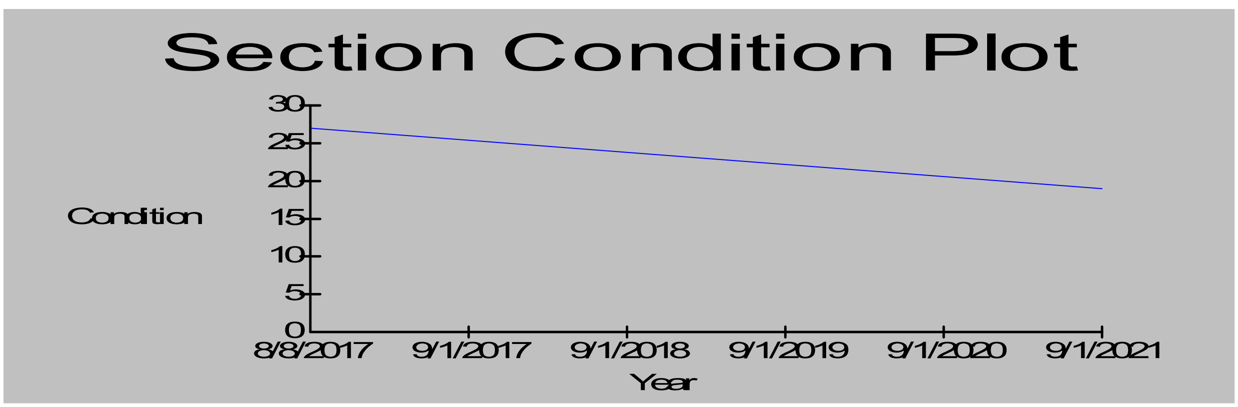
Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
3	Hotel Apron	7/26/2017	Inspection	58	12	Fair	43,750.00
3	Hotel Apron	9/1/2017	Prediction	58	12	Fair	43,750.00
3	Hotel Apron	9/1/2018	Prediction	54	13	Poor	43,750.00
3	Hotel Apron	9/1/2019	Prediction	50	14	Poor	43,750.00
3	Hotel Apron	9/1/2020	Prediction	47	15	Poor	43,750.00
3	Hotel Apron	9/1/2021	Prediction	43	16	Poor	43,750.00

Maintenance Apron



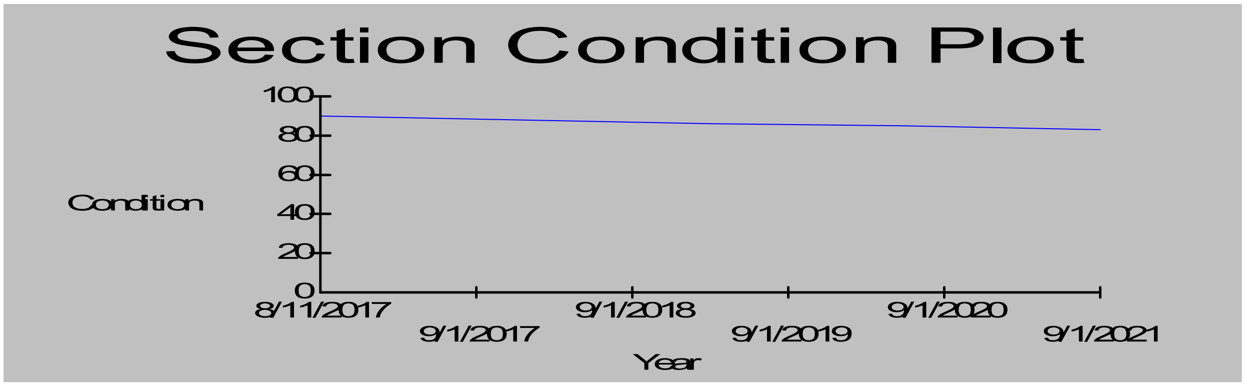
Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
3	Maintenance	8/7/2017	Inspection	60	38	Fair	59,062.50
3	Maintenance	9/1/2017	Prediction	60	38	Fair	59,062.50
3	Maintenance	9/1/2018	Prediction	59	39	Fair	59,062.50
3	Maintenance	9/1/2019	Prediction	58	40	Fair	59,062.50
3	Maintenance	9/1/2020	Prediction	57	41	Fair	59,062.50
3	Maintenance	9/1/2021	Prediction	56	42	Fair	59,062.50

Old North Apron



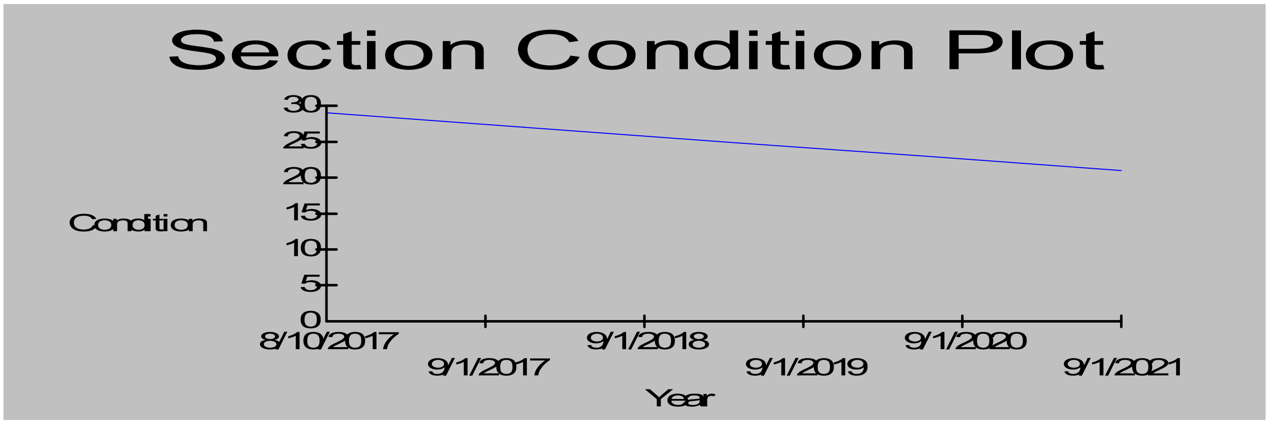
Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
3	Old North	8/8/2017	Inspection	27	38	Very Poor	101,250.00
3	Old North	9/1/2017	Prediction	27	38	Very Poor	101,250.00
3	Old North	9/1/2018	Prediction	25	39	Serious	101,250.00
3	Old North	9/1/2019	Prediction	23	40	Serious	101,250.00
3	Old North	9/1/2020	Prediction	21	41	Serious	101,250.00
3	Old North	9/1/2021	Prediction	19	42	Serious	101,250.00

New North Apron



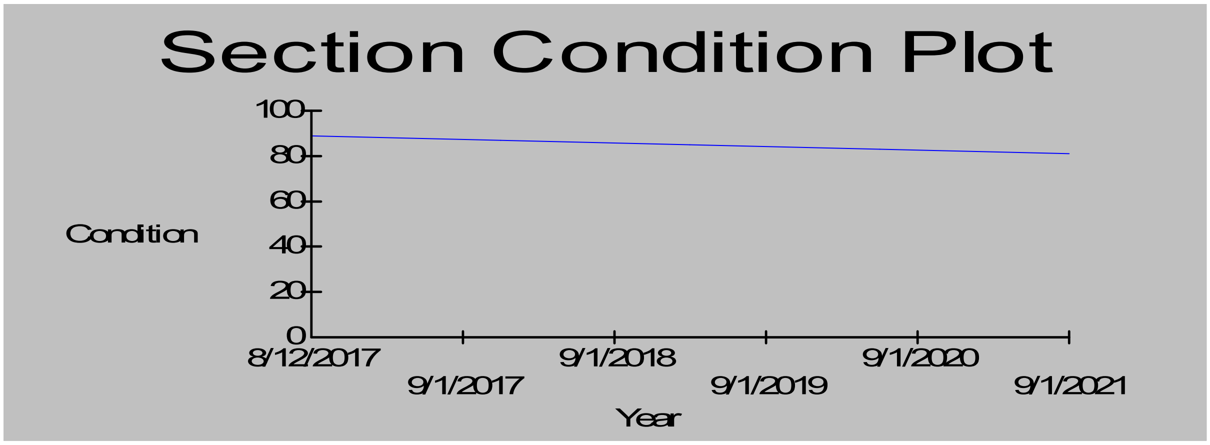
Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
3	New North	8/11/2017	Inspection	90	6	Good	39,375.00
3	New North	9/1/2017	Prediction	90	6	Good	39,375.00
3	New North	9/1/2018	Prediction	88	7	Good	39,375.00
3	New North	9/1/2019	Prediction	86	8	Good	39,375.00
3	New North	9/1/2020	Prediction	85	9	Satisfactory	39,375.00
3	New North	9/1/2021	Prediction	83	10	Satisfactory	39,375.00

Old South Apron



Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
3	Old South	8/10/2017	Inspection	29	38	Very Poor	101,250.00
3	Old South	9/1/2017	Prediction	29	38	Very Poor	101,250.00
3	Old South	9/1/2018	Prediction	27	39	Very Poor	101,250.00
3	Old South	9/1/2019	Prediction	25	40	Serious	101,250.00
3	Old South	9/1/2020	Prediction	23	41	Serious	101,250.00
3	Old South	9/1/2021	Prediction	21	42	Serious	101,250.00

New South Apron



Branch ID	Section ID	Activity Date	Activity	Condition	Age	Condition Category	Area
3	New South	8/12/2017	Inspection	89	6	Good	40,000.50
3	New South	9/1/2017	Prediction	89	6	Good	40,000.50
3	New South	9/1/2018	Prediction	87	7	Good	40,000.50
3	New South	9/1/2019	Prediction	85	8	Satisfactory	40,000.50
3	New South	9/1/2020	Prediction	83	9	Satisfactory	40,000.50
3	New South	9/1/2021	Prediction	81	10	Satisfactory	40,000.50

Appendix E

M&R Plan for One Year

Network	Branch	Section	Distress	Severity	Descriptions	Quantity	Unit	Policy	WorkType	WorkUnit	Work Quantity	Unit Cost	Total Cost	New Distress	New Severity	New Descriptions
1	2	Alpha	8	H	LONGITUDINAL/TRANSVERSE CRACKING	105.75	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	105.75	2	JOD 211.50	8	M	L & T CR
1	2	Lima	7	M	JOINT REFLECTION CRACKING	17.91667	m	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	17.92	2	JOD 35.83	7	L	JT REF. CR
1	2	Golf	7	H	LARGE PATCH/UTILITY	54.35295	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m^2	611.47	142	JOD 86,828.85	7	L	LARGE PATCH
1	3	Cargo	14	L	JOINT SPALLING	6.6	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old South	3	H	LINEAR CRACKING	194.9999	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Crack Sealing - PCC	m	1462.5	3	JOD 4,387.50	3	M	LINEAR CR
1	2	Alpha	12	L	WEATHERING/RAVELING	1956.374	m^2	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Alpha	2	N	BLEEDING	6.8385	m^2	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Alpha	8	M	LONGITUDINAL/TRANSVERSE CRACKING	793.1249	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Bravo	7	L	JOINT REFLECTION CRACKING	40.05555	m	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Bravo	7	M	JOINT REFLECTION CRACKING	51.5	m	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	51.5	2	JOD 103.00	7	L	JT REF. CR
1	2	Bravo	13	L	RUTTING	1.907407	m^2	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Bravo	1	M	ALLIGATOR CRACKING	15.25926	m^2	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Bravo	8	L	LONGITUDINAL/TRANSVERSE CRACKING	43.87037	m	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Bravo	12	H	WEATHERING/RAVELING	25.42574	m^2	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Bravo	12	M	WEATHERING/RAVELING	36.24073	m^2	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Bravo	7	H	JOINT REFLECTION CRACKING	19.07408	m	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	19.07	2	JOD 38.15	7	M	JT REF. CR
1	2	Bravo	1	L	ALLIGATOR CRACKING	13.35185	m^2	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Bravo	13	M	RUTTING	3.179648	m^2	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Patching - AC Deep	m^2	3.18	40	JOD 127.19	10	L	PATCHING
1	2	Bravo	3	L	BLOCK CRACKING	1.852093	m^2	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Bravo	8	H	LONGITUDINAL/TRANSVERSE CRACKING	11.44444	m	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	11.44	2	JOD 22.89	8	M	L & T CR
1	2	Bravo	12	L	WEATHERING/RAVELING	183.1111	m^2	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Bravo	8	M	LONGITUDINAL/TRANSVERSE CRACKING	19.07408	m	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	19.07	2	JOD 38.15	8	L	L & T CR
1	2	Charli	7	L	JOINT REFLECTION CRACKING	189.9167	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Charli	7	M	JOINT REFLECTION CRACKING	204.25	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Charli	13	L	RUTTING	28.66666	m^2	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Charli	1	M	ALLIGATOR CRACKING	103.9167	m^2	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Charli	8	L	LONGITUDINAL/TRANSVERSE CRACKING	258	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Charli	12	H	WEATHERING/RAVELING	136.1667	m^2	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Charli	10	L	PATCHING	0.680833	m^2	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Charli	12	M	WEATHERING/RAVELING	154.0833	m^2	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Charli	7	H	JOINT REFLECTION CRACKING	10.2125	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	10.21	2	JOD 20.42	7	M	JT REF. CR
1	2	Charli	13	H	RUTTING	15.35458	m^2	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - AC Deep	m^2	15.35	40	JOD 614.18	10	L	PATCHING
1	2	Charli	1	L	ALLIGATOR CRACKING	78.83332	m^2	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Charli	13	M	RUTTING	1.361667	m^2	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Charli	12	L	WEATHERING/RAVELING	143.3333	m^2	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Charli	8	M	LONGITUDINAL/TRANSVERSE CRACKING	89.58334	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Delta	7	L	JOINT REFLECTION CRACKING	68.08334	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Lima	1	L	ALLIGATOR CRACKING	10.75	m^2	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Lima	11	N	POLISHED AGGREGATE	35.83334	m^2	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Lima	8	H	LONGITUDINAL/TRANSVERSE CRACKING	7.166667	m	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	7.17	2	JOD 14.33	8	M	L & T CR
1	2	Lima	12	L	WEATHERING/RAVELING	71.66666	m^2	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Lima	2	N	BLEEDING	1.361667	m^2	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Lima	8	M	LONGITUDINAL/TRANSVERSE CRACKING	82.41667	m	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	82.42	2	JOD 164.83	8	L	L & T CR
1	2	Juliet	9	N	OIL SPILLAGE	3.500001	m^2	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Juliet	8	M	LONGITUDINAL/TRANSVERSE CRACKING	3.64	m	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	3.64	2	JOD 7.28	8	L	L & T CR
1	2	Juliet	5	L	DEPRESSION	2.9225	m^2	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Juliet	8	L	LONGITUDINAL/TRANSVERSE CRACKING	45.50001	m	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Juliet	12	L	WEATHERING/RAVELING	26.25	m^2	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Eco	5	H	JOINT SEAL DAMAGE	18	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Eco	7	L	LARGE PATCH/UTILITY	7	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			

Network	Branch	Section	Distress	Severity	Descriptions	Quantity	Unit	Policy	WorkType	WorkUnit	Work Quantity	Unit Cost	Total Cost	New Distress	New Severity	New Descriptions
1	2	Eco	3	L	LINEAR CRACKING	2	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Eco	5	M	JOINT SEAL DAMAGE	18	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Eco	11	M	FAULTING	2	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Eco	11	H	FAULTING	7	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Grinding (Localized)	m	52.5	40	JOD 2,100.00			
1	2	Eco	2	H	CORNER BREAK	4	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	12	142	JOD 1,704.00	7	L	LARGE PATCH
1	2	Eco	12	H	SHATTERED SLAB	13	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Slab Replacement - PCC	m²	731.25	142	JOD 103,837.50			
1	2	Eco	4	L	DURABILITY CRACKING	1	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Eco	2	M	CORNER BREAK	4	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Eco	7	H	LARGE PATCH/UTILITY	7	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	78.75	142	JOD 11,182.50	7	L	LARGE PATCH
1	2	Eco	3	H	LINEAR CRACKING	19	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Crack Sealing - PCC	m	142.5	3	JOD 427.50	3	M	LINEAR CR
1	2	Eco	5	L	JOINT SEAL DAMAGE	36	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Eco	7	M	LARGE PATCH/UTILITY	7	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Eco	3	M	LINEAR CRACKING	6.000001	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Eco	4	M	DURABILITY CRACKING	2	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Eco	4	H	DURABILITY CRACKING	3	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Slab Replacement - PCC	m²	168.75	142	JOD 23,962.50			
1	2	Eco	11	L	FAULTING	3	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Foxtrot	5	H	JOINT SEAL DAMAGE	93.17648	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Foxtrot	1	H	BLOW-UP	1.941177	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	29.12	142	JOD 4,134.71	7	L	LARGE PATCH
1	2	Foxtrot	11	H	FAULTING	21.35294	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Grinding (Localized)	m	160.15	40	JOD 6,405.88			
1	2	Golf	3	H	LINEAR CRACKING	133.9412	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Crack Sealing - PCC	m	1004.56	3	JOD 3,013.68	3	M	LINEAR CR
1	2	Golf	5	L	JOINT SEAL DAMAGE	248.4706	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Golf	7	M	LARGE PATCH/UTILITY	23.29412	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Golf	3	M	LINEAR CRACKING	34.94117	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Golf	4	M	DURABILITY CRACKING	27.17647	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Golf	4	H	DURABILITY CRACKING	21.35294	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Slab Replacement - PCC	m²	1201.1	142	JOD 170,556.60			
1	2	Golf	6	M	SMALL PATCH	5.823529	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Golf	7	L	LARGE PATCH/UTILITY	9.705881	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Golf	2	L	CORNER BREAK	5.823529	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Golf	12	L	SHATTERED SLAB	13.58823	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Golf	14	M	JOINT SPALLING	7.764704	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	November	2	L	CORNER BREAK	1.333333	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	November	3	L	LINEAR CRACKING	2.666666	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	November	2	H	CORNER BREAK	1.333333	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	4	142	JOD 568.00	7	L	LARGE PATCH
1	2	November	5	L	JOINT SEAL DAMAGE	85.33334	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	November	3	H	LINEAR CRACKING	6.666666	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - PCC	m	50	3	JOD 150.00	3	M	LINEAR CR
1	2	November	13	N	SHRINKAGE CRACKING	6.666666	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	November	2	M	CORNER BREAK	1.333333	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	4	142	JOD 568.00	7	L	LARGE PATCH
1	2	November	3	M	LINEAR CRACKING	8	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - PCC	m	60	3	JOD 180.00	3	L	LINEAR CR
1	2	Seira	11	H	FAULTING	5.333334	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Grinding (Localized)	m	40	40	JOD 1,600.00			
1	2	Seira	3	L	LINEAR CRACKING	2.666666	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Seira	11	L	FAULTING	1.333333	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Seira	11	M	FAULTING	5.333334	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Seira	2	H	CORNER BREAK	14.66666	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	44	142	JOD 6,248.00	7	L	LARGE PATCH
1	2	Seira	12	H	SHATTERED SLAB	18.66666	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Slab Replacement - PCC	m²	1050	142	JOD 149,100.00			
1	2	Seira	14	L	JOINT SPALLING	1.333333	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Seira	2	M	CORNER BREAK	9.333332	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Seira	7	H	LARGE PATCH/UTILITY	30.66666	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	345	142	JOD 48,989.99	7	L	LARGE PATCH
1	2	Seira	3	H	LINEAR CRACKING	20	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Crack Sealing - PCC	m	150	3	JOD 450.00	3	M	LINEAR CR
1	2	Seira	5	L	JOINT SEAL DAMAGE	85.33334	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Seira	7	M	LARGE PATCH/UTILITY	13.33334	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			

Network	Branch	Section	Distress	Severity	Descriptions	Quantity	Unit	Policy	WorkType	WorkUnit	Work Quantity	Unit Cost	Total Cost	New Distress	New Severity	New Descriptions
1	2	Seira	3	M	LINEAR CRACKING	16	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Cargo	2	M	CORNER BREAK	24.2	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Cargo	15	M	CORNER SPALLING	6.6	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Cargo	5	H	JOINT SEAL DAMAGE	70.4	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Cargo	7	H	LARGE PATCH/UTILITY	22	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	247.5	142	JOD 35,145.00	7	L	LARGE PATCH
1	3	Cargo	3	H	LINEAR CRACKING	112.2	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Crack Sealing - PCC	m	841.5	3	JOD 2,524.50	3	M	LINEAR CR
1	3	Cargo	5	L	JOINT SEAL DAMAGE	246.4	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Cargo	7	M	LARGE PATCH/UTILITY	6.6	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Cargo	3	M	LINEAR CRACKING	63.8	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Cargo	8	N	POPOUTS	4.4	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Cargo	4	M	DURABILITY CRACKING	4.4	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Cargo	14	H	JOINT SPALLING	15.4	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Partial Depth	m²	11.55	0	JOD 0.00	7	L	LARGE PATCH
1	3	Cargo	2	L	CORNER BREAK	2.2	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Cargo	11	L	FAULTING	4.4	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Cargo	14	M	JOINT SPALLING	15.4	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Maintenace	7	L	LARGE PATCH/UTILITY	4.421052	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Maintenace	3	L	LINEAR CRACKING	2.210526	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Maintenace	5	M	JOINT SEAL DAMAGE	276.3158	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Maintenace	15	M	CORNER SPALLING	2.210526	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Maintenace	11	M	FAULTING	2.210526	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Maintenace	13	N	SHRINKAGE CRACKING	8.842105	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Maintenace	2	H	CORNER BREAK	15.47368	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	46.42	142	JOD 6,591.79	7	L	LARGE PATCH
1	3	Maintenace	12	H	SHATTERED SLAB	17.68421	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Slab Replacement - PCC	m²	994.74	142	JOD 141,252.60			
1	3	Maintenace	14	L	JOINT SPALLING	8.842105	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Maintenace	2	M	CORNER BREAK	33.1579	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Maintenace	3	H	LINEAR CRACKING	68.52631	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Crack Sealing - PCC	m	513.95	3	JOD 1,541.84	3	M	LINEAR CR
1	3	Maintenace	5	L	JOINT SEAL DAMAGE	663.1579	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Maintenace	15	L	CORNER SPALLING	2.210526	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Maintenace	3	M	LINEAR CRACKING	50.8421	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Maintenace	6	L	SMALL PATCH	8.842105	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Maintenace	2	L	CORNER BREAK	11.05264	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Maintenace	11	L	FAULTING	2.210526	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Maintenace	14	M	JOINT SPALLING	8.842105	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old North	11	H	FAULTING	23.99999	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Grinding (Localized)	m	180	40	JOD 7,200.00			
1	3	Old South	5	L	JOINT SEAL DAMAGE	1575	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old South	7	M	LARGE PATCH/UTILITY	39.00001	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old South	3	M	LINEAR CRACKING	141	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old South	8	N	POPOUTS	3	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old South	14	H	JOINT SPALLING	6	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Partial Depth	m²	4.5	0	JOD 0.00	7	L	LARGE PATCH
1	3	Old South	6	L	SMALL PATCH	6	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old South	2	L	CORNER BREAK	21.00001	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old South	14	M	JOINT SPALLING	18	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old South	15	L	CORNER SPALLING	3	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	New North	2	L	CORNER BREAK	30.13043	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	New North	3	L	LINEAR CRACKING	13.69565	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	New North	2	H	CORNER BREAK	8.217392	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	24.65	142	JOD 3,500.61	7	L	LARGE PATCH
1	3	New North	5	L	JOINT SEAL DAMAGE	821.7391	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	New North	3	H	LINEAR CRACKING	2.73913	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - PCC	m	13.7	3	JOD 41.09	3	M	LINEAR CR
1	3	New North	13	N	SHRINKAGE CRACKING	73.95652	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	New North	2	M	CORNER BREAK	19.17391	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	57.52	142	JOD 8,168.08	7	L	LARGE PATCH

Network	Branch	Section	Distress	Severity	Descriptions	Quantity	Unit	Policy	WorkType	WorkUnit	Work Quantity	Unit Cost	Total Cost	New Distress	New Severity	New Descriptions
1	3	New North	3	M	LINEAR CRACKING	21.91304	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - PCC	m	109.57	3	JOD 328.70	3	L	LINEAR CR
1	3	New South	12	L	SHATTERED SLAB	5.565217	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	New South	2	L	CORNER BREAK	19.47826	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	New South	3	L	LINEAR CRACKING	19.47826	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	New South	3	M	LINEAR CRACKING	25.04347	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - PCC	m	125.22	3	JOD 375.65	3	L	LINEAR CR
1	3	New South	5	L	JOINT SEAL DAMAGE	1113.043	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	New South	3	H	LINEAR CRACKING	2.782609	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - PCC	m	13.91	3	JOD 41.74	3	M	LINEAR CR
1	3	New South	13	N	SHRINKAGE CRACKING	77.91304	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	New South	2	M	CORNER BREAK	25.04347	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	75.13	142	JOD 10,668.52	7	L	LARGE PATCH
1	3	New South	2	H	CORNER BREAK	5.565217	C	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	16.7	142	JOD 2,370.78	7	L	LARGE PATCH
1	2	Delta	7	M	JOINT REFLECTION CRACKING	53.74999	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Delta	13	L	RUTTING	50.16666	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Delta	1	M	ALLIGATOR CRACKING	71.66666	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Delta	8	L	LONGITUDINAL/TRANSVERSE CRACKING	143.3333	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Delta	12	H	WEATHERING/RAVELING	75.24999	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Delta	10	L	PATCHING	515.9999	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Delta	12	M	WEATHERING/RAVELING	179.1667	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Delta	7	H	JOINT REFLECTION CRACKING	21.5	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	21.5	2	JOD 43.00	7	M	JT REF. CR
1	2	Delta	13	H	RUTTING	10.75	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - AC Deep	m²	10.75	40	JOD 430.00	10	L	PATCHING
1	2	Delta	1	L	ALLIGATOR CRACKING	82.41667	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Foxtrot	3	L	LINEAR CRACKING	3.882353	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Seira	4	H	DURABILITY CRACKING	2.666666	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Slab Replacement - PCC	m²	150	142	JOD 21,300.00			
1	3	Old North	3	L	LINEAR CRACKING	33	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Delta	13	M	RUTTING	43	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Delta	11	N	POLISHED AGGREGATE	6.844167	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Delta	8	H	LONGITUDINAL/TRANSVERSE CRACKING	10.2125	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	10.21	2	JOD 20.42	8	M	L & T CR
1	2	Delta	12	L	WEATHERING/RAVELING	336.8334	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Delta	8	M	LONGITUDINAL/TRANSVERSE CRACKING	103.9167	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Delta	1	H	ALLIGATOR CRACKING	2.0425	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - AC Deep	m²	4.17	40	JOD 166.70	10	L	PATCHING
1	2	Hotel	3	L	BLOCK CRACKING	105.75	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Hotel	10	L	PATCHING	10.2225	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Hotel	8	M	LONGITUDINAL/TRANSVERSE CRACKING	352.5	m	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	352.5	2	JOD 705.00	8	L	L & T CR
1	2	Hotel	12	L	WEATHERING/RAVELING	352.5	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Hotel	2	N	BLEEDING	6.8385	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Hotel	11	N	POLISHED AGGREGATE	34.1925	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Hotel	8	L	LONGITUDINAL/TRANSVERSE CRACKING	423	m	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Hotel	3	M	BLOCK CRACKING	6.8385	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	6.84	2	JOD 13.68	3	L	BLOCK CR
1	2	Hotel	12	M	WEATHERING/RAVELING	229.125	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Mike	3	L	BLOCK CRACKING	9.364137	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Mike	1	L	ALLIGATOR CRACKING	3.745653	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Mike	8	M	LONGITUDINAL/TRANSVERSE CRACKING	33.71088	m	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	33.71	2	JOD 67.42	8	L	L & T CR
1	2	Mike	12	L	WEATHERING/RAVELING	31.83805	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Mike	10	L	PATCHING	1.086239	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Mike	13	L	RUTTING	0.726657	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Mike	8	L	LONGITUDINAL/TRANSVERSE CRACKING	37.45653	m	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Mike	3	M	BLOCK CRACKING	1.816642	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	1.82	2	JOD 3.63	3	L	BLOCK CR
1	2	Mike	12	M	WEATHERING/RAVELING	31.83805	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Kilo	3	L	BLOCK CRACKING	3.404167	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Kilo	13	L	RUTTING	3.404167	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Kilo	1	M	ALLIGATOR CRACKING	3.404167	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			

Network	Branch	Section	Distress	Severity	Descriptions	Quantity	Unit	Policy	WorkType	WorkUnit	Work Quantity	Unit Cost	Total Cost	New Distress	New Severity	New Descriptions
1	2	Kilo	8	L	LONGITUDINAL/TRANSVERSE CRACKING	121.8333	m	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Kilo	12	H	WEATHERING/RAVELING	14.33333	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Kilo	10	L	PATCHING	1.361667	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Kilo	12	M	WEATHERING/RAVELING	57.33332	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Kilo	3	H	BLOCK CRACKING	14.33333	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	14.33	2	JOD 28.67	3	M	BLOCK CR
1	2	Foxtrot	5	M	JOINT SEAL DAMAGE	279.5294	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Foxtrot	1	M	BLOW-UP	1.941177	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	21.84	142	JOD 3,101.03	7	L	LARGE PATCH
1	2	Foxtrot	11	M	FAULTING	31.05882	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Foxtrot	6	H	SMALL PATCH	1.941177	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Partial Depth	m²	0.49	0	JOD 0.00	7	L	LARGE PATCH
1	2	Foxtrot	2	H	CORNER BREAK	33	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	99	142	JOD 14,058.00	7	L	LARGE PATCH
1	2	Foxtrot	12	H	SHATTERED SLAB	66	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Slab Replacement - PCC	m²	3712.5	142	JOD 527,175.00			
1	2	Foxtrot	7	L	LARGE PATCH/UTILITY	3.882353	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Foxtrot	6	M	SMALL PATCH	7.764704	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Foxtrot	2	M	CORNER BREAK	23.29412	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Foxtrot	12	M	SHATTERED SLAB	3.882353	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Foxtrot	7	H	LARGE PATCH/UTILITY	13.58823	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	152.87	142	JOD 21,707.20	7	L	LARGE PATCH
1	2	Foxtrot	3	H	LINEAR CRACKING	91.23529	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Crack Sealing - PCC	m	684.26	3	JOD 2,052.79	3	M	LINEAR CR
1	2	Foxtrot	5	L	JOINT SEAL DAMAGE	155.2941	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Foxtrot	7	M	LARGE PATCH/UTILITY	21.35294	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Foxtrot	3	M	LINEAR CRACKING	46.58824	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Foxtrot	6	L	SMALL PATCH	3.882353	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Foxtrot	2	L	CORNER BREAK	3.882353	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Foxtrot	11	L	FAULTING	13.58823	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Foxtrot	14	M	JOINT SPALLING	3.882353	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Foxtrot	14	L	JOINT SPALLING	1.941177	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Golf	15	H	CORNER SPALLING	7.764704	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Partial Depth	m²	1.94	0	JOD 0.00	7	L	LARGE PATCH
1	2	Golf	11	H	FAULTING	9.705881	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Grinding (Localized)	m	72.79	40	JOD 2,911.76			
1	2	Golf	3	L	LINEAR CRACKING	7.764704	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Golf	5	M	JOINT SEAL DAMAGE	93.17648	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Golf	14	H	JOINT SPALLING	1.941177	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Partial Depth	m²	1.46	0	JOD 0.00	7	L	LARGE PATCH
1	2	Golf	11	M	FAULTING	27.17647	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Golf	13	N	SHRINKAGE CRACKING	33	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Golf	14	L	JOINT SPALLING	5.823529	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Golf	2	H	CORNER BREAK	9.705881	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	29.12	142	JOD 4,134.71	7	L	LARGE PATCH
1	2	Golf	12	H	SHATTERED SLAB	108.7059	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Slab Replacement - PCC	m²	6114.71	142	JOD 868,288.40			
1	2	Golf	11	L	FAULTING	7.764704	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Golf	2	M	CORNER BREAK	1.941177	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	1	1	7	L	JOINT REFLECTION CRACKING	2562.001	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	1	1	3	L	BLOCK CRACKING	960.75	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	1	1	13	L	RUTTING	160.125	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	1	1	1	M	ALLIGATOR CRACKING	160.125	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	1	1	8	L	LONGITUDINAL/TRANSVERSE CRACKING	2424.751	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	1	1	12	H	WEATHERING/RAVELING	76.24238	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	1	1	10	L	PATCHING	503.2501	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	1	1	12	M	WEATHERING/RAVELING	1647	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	1	1	7	H	JOINT REFLECTION CRACKING	434.6251	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	434.63	2	JOD 869.25	7	M	JT REF. CR
1	1	1	3	H	BLOCK CRACKING	76.17375	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	1	1	7	M	JOINT REFLECTION CRACKING	1235.25	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	1	1	1	L	ALLIGATOR CRACKING	777.7501	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	1	1	3	M	BLOCK CRACKING	1166.625	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	1166.63	2	JOD 2,333.25	3	L	BLOCK CR

Network	Branch	Section	Distress	Severity	Descriptions	Quantity	Unit	Policy	WorkType	WorkUnit	Work Quantity	Unit Cost	Total Cost	New Distress	New Severity	New Descriptions
1	1	1	13	M	RUTTING	45.74999	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	1	1	11	N	POLISHED AGGREGATE	114.375	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	1	1	9	N	OIL SPILLAGE	38.20125	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	1	1	8	H	LONGITUDINAL/TRANSVERSE CRACKING	183	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	183	2	JOD 366.00	8	M	L & T CR
1	1	1	12	L	WEATHERING/RAVELING	1875.75	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	1	1	8	M	LONGITUDINAL/TRANSVERSE CRACKING	1281	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	1	1	1	H	ALLIGATOR CRACKING	152.5762	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - AC Deep	m²	168.1	40	JOD 6,724.06	10	L	PATCHING
1	2	Alpha	7	L	JOINT REFLECTION CRACKING	846.0001	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Alpha	3	L	BLOCK CRACKING	52.875	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Alpha	13	L	RUTTING	246.75	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Alpha	1	M	ALLIGATOR CRACKING	616.875	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Alpha	8	L	LONGITUDINAL/TRANSVERSE CRACKING	987	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Alpha	12	H	WEATHERING/RAVELING	705.0001	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Alpha	10	L	PATCHING	205.5075	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Alpha	12	M	WEATHERING/RAVELING	1392.375	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Alpha	7	H	JOINT REFLECTION CRACKING	88.125	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	88.13	2	JOD 176.25	7	M	JT REF. CR
1	2	Alpha	13	H	RUTTING	70.49999	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - AC Deep	m²	70.5	40	JOD 2,820.00	10	L	PATCHING
1	2	Alpha	7	M	JOINT REFLECTION CRACKING	493.4999	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Alpha	1	L	ALLIGATOR CRACKING	334.875	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Alpha	13	M	RUTTING	88.125	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Alpha	9	N	OIL SPILLAGE	35.25	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Seira	14	H	JOINT SPALLING	2.666666	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Partial Depth	m²	2	0	JOD 0.00	7	L	LARGE PATCH
1	2	Seira	7	L	LARGE PATCH/UTILITY	4	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Seira	4	M	DURABILITY CRACKING	5.333334	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Seira	14	M	JOINT SPALLING	2.666666	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Hotel Apro	3	L	BLOCK CRACKING	70	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Hotel Apro	5	M	DEPRESSION	53.84614	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Hotel Apro	1	M	ALLIGATOR CRACKING	80.76923	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Hotel Apro	8	L	LONGITUDINAL/TRANSVERSE CRACKING	296.1539	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Hotel Apro	12	H	WEATHERING/RAVELING	17.23077	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Hotel Apro	10	L	PATCHING	150.7692	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Hotel Apro	12	M	WEATHERING/RAVELING	236.9231	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Hotel Apro	13	L	RUTTING	21.53846	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Hotel Apro	5	L	DEPRESSION	96.9231	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Hotel Apro	1	L	ALLIGATOR CRACKING	59.23077	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Hotel Apro	3	M	BLOCK CRACKING	80.76923	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	80.77	2	JOD 161.54	3	L	BLOCK CR
1	3	Hotel Apro	11	N	POLISHED AGGREGATE	43.07692	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Hotel Apro	9	N	OIL SPILLAGE	53.84614	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Hotel Apro	8	H	LONGITUDINAL/TRANSVERSE CRACKING	236.9231	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	236.92	2	JOD 473.85	8	M	L & T CR
1	3	Hotel Apro	12	L	WEATHERING/RAVELING	355.3846	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Hotel Apro	10	M	PATCHING	43.07692	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Hotel Apro	8	M	LONGITUDINAL/TRANSVERSE CRACKING	463.0771	m	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Hotel Apro	5	H	DEPRESSION	16.15385	m²	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - AC Deep	m²	21.46	40	JOD 858.25	10	L	PATCHING
1	3	Cargo	6	M	SMALL PATCH	8.8	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Cargo	15	H	CORNER SPALLING	4.4	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Partial Depth	m²	1.1	0	JOD 0.00	7	L	LARGE PATCH
1	3	Cargo	11	H	FAULTING	30.8	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Grinding (Localized)	m	231	40	JOD 9,240.00			
1	3	Cargo	3	L	LINEAR CRACKING	4.4	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Cargo	5	M	JOINT SEAL DAMAGE	387.2	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Cargo	12	L	SHATTERED SLAB	6.6	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Cargo	11	M	FAULTING	28.6	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			

Network	Branch	Section	Distress	Severity	Descriptions	Quantity	Unit	Policy	WorkType	WorkUnit	Work Quantity	Unit Cost	Total Cost	New Distress	New Severity	New Descriptions
1	3	Cargo	13	N	SHRINKAGE CRACKING	13.2	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Cargo	6	H	SMALL PATCH	6.6	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Partial Depth	m²	1.65	0	JOD 0.00	7	L	LARGE PATCH
1	3	Cargo	2	H	CORNER BREAK	30.8	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	92.4	142	JOD 13,120.80	7	L	LARGE PATCH
1	3	Cargo	12	H	SHATTERED SLAB	72.6	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Slab Replacement - PCC	m²	4083.75	142	JOD 579,892.50			
1	3	Old North	5	M	JOINT SEAL DAMAGE	450	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old North	14	L	JOINT SPALLING	6	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old North	11	M	FAULTING	12	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old North	13	N	SHRINKAGE CRACKING	27	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old North	6	H	SMALL PATCH	36	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Partial Depth	m²	9	0	JOD 0.00	7	L	LARGE PATCH
1	3	Old North	2	H	CORNER BREAK	168	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	504	142	JOD 71,567.99	7	L	LARGE PATCH
1	3	Old North	12	H	SHATTERED SLAB	84.00001	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Slab Replacement - PCC	m²	4725	142	JOD 670,950.10			
1	3	Old North	6	M	SMALL PATCH	33	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old North	2	M	CORNER BREAK	54	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old North	15	M	CORNER SPALLING	18	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old North	7	H	LARGE PATCH/UTILITY	51	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	573.75	142	JOD 81,472.49	7	L	LARGE PATCH
1	3	Old North	3	H	LINEAR CRACKING	201.0001	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Crack Sealing - PCC	m	1507.5	3	JOD 4,522.50	3	M	LINEAR CR
1	3	Old North	5	L	JOINT SEAL DAMAGE	1350	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old North	7	M	LARGE PATCH/UTILITY	23.99999	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old North	3	M	LINEAR CRACKING	144	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old North	14	H	JOINT SPALLING	3	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Partial Depth	m²	2.25	0	JOD 0.00	7	L	LARGE PATCH
1	3	Old North	7	L	LARGE PATCH/UTILITY	6	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old North	2	L	CORNER BREAK	23.99999	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old North	14	M	JOINT SPALLING	6	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old South	15	H	CORNER SPALLING	12	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Partial Depth	m²	3	0	JOD 0.00	7	L	LARGE PATCH
1	3	Old South	11	H	FAULTING	9	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Grinding (Localized)	m	67.5	40	JOD 2,700.00			
1	3	Old South	3	L	LINEAR CRACKING	41.99999	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old South	5	M	JOINT SEAL DAMAGE	150	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old South	15	M	CORNER SPALLING	9	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old South	11	M	FAULTING	23.99999	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old South	13	N	SHRINKAGE CRACKING	6	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old South	6	H	SMALL PATCH	39.00001	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Partial Depth	m²	9.75	0	JOD 0.00	7	L	LARGE PATCH
1	3	Old South	2	H	CORNER BREAK	165	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	495	142	JOD 70,290.00	7	L	LARGE PATCH
1	3	Old South	12	H	SHATTERED SLAB	57.00001	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Slab Replacement - PCC	m²	3206.25	142	JOD 455,287.60			
1	3	Old South	14	L	JOINT SPALLING	3	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old South	2	M	CORNER BREAK	54	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old South	12	M	SHATTERED SLAB	27	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	3	Old South	7	H	LARGE PATCH/UTILITY	41.99999	C	LOCALIZED SAFETY FOR AIRFIELDS (DEFAULT)	Patching - PCC Full Depth	m²	472.5	142	JOD 67,094.98	7	L	LARGE PATCH
1	2	Kilo	1	L	ALLIGATOR CRACKING	3.404167	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Kilo	3	M	BLOCK CRACKING	3.404167	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	3.4	2	JOD 6.81	3	L	BLOCK CR
1	2	Kilo	11	N	POLISHED AGGREGATE	28.66666	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Kilo	8	H	LONGITUDINAL/TRANSVERSE CRACKING	35.83334	m	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	35.83	2	JOD 71.67	8	M	L & T CR
1	2	Kilo	12	L	WEATHERING/RAVELING	114.6667	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Kilo	2	N	BLEEDING	2.723333	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Kilo	8	M	LONGITUDINAL/TRANSVERSE CRACKING	103.9167	m	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	103.92	2	JOD 207.83	8	L	L & T CR
1	2	Lima	7	L	JOINT REFLECTION CRACKING	14.33333	m	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Lima	3	L	BLOCK CRACKING	14.33333	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Lima	13	L	RUTTING	3.583334	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Lima	8	L	LONGITUDINAL/TRANSVERSE CRACKING	86.00001	m	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Lima	12	H	WEATHERING/RAVELING	6.808333	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Lima	10	L	PATCHING	2.0425	m²	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			

Network	Branch	Section	Distress	Severity	Descriptions	Quantity	Unit	Policy	WorkType	WorkUnit	Work Quantity	Unit Cost	Total Cost	New Distress	New Severity	New Descriptions
1	2	Lima	12	M	WEATHERING/RAVELING	32.24999	m^2	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)					JOD 0.00			
1	2	Lima	7	H	JOINT REFLECTION CRACKING	3.404167	m	LOCALIZED PREV. FOR AIRFIELDS (DEFAULT)	Crack Sealing - AC	m	3.4	2	JOD 6.81	7	M	JT REF. CR

Appendix F

M&R Plan for Five Year

Year	Network	Branch	Section	SectionArea	AreaUnit	Sum of Stop Gap	Sum of Preventive	Sum of Major	Sum of Total	PCI Before Average	PCI After Average
2018	1	1	1	219,600	m²	JOD 0.00	JOD 0.00	JOD 8,810,005.00	JOD 8,810,005.00	59	100
2018	1	1	2	219,600	m²	JOD 0.00	JOD 0.00	JOD 0.00	JOD 0.00	100	100
2018	1	2	Alpha	145,089	m²	JOD 0.00	JOD 0.00	JOD 5,862,833.50	JOD 5,862,833.50	57	100
2018	1	2	Bravo	8,832	m²	JOD 0.00	JOD 329.38	JOD 0.00	JOD 329.38	71	73
2018	1	2	Charli	22,575	m²	JOD 0.00	JOD 0.00	JOD 905,673.38	JOD 905,673.38	59	100
2018	1	2	Delta	22,575	m²	JOD 0.00	JOD 0.00	JOD 995,831.19	JOD 995,831.19	54	100
2018	1	2	Eco	4,050	m²	JOD 0.00	JOD 0.00	JOD 767,082.13	JOD 767,082.13	2	100
2018	1	2	Foxtrot	29,700	m²	JOD 578,703.50	JOD 0.00	JOD 5,640,550.50	JOD 6,219,254.00	12	42
2018	1	2	Golf	29,700	m²	JOD 1,136,216.00	JOD 0.00	JOD 5,623,427.00	JOD 6,759,643.00	3	37
2018	1	2	Hotel	145,089	m²	JOD 0.00	JOD 718.68	JOD 0.00	JOD 718.68	88	88
2018	1	2	Juliet	3,360	m²	JOD 0.00	JOD 7.28	JOD 0.00	JOD 7.28	93	93
2018	1	2	Kilo	22,575	m²	JOD 0.00	JOD 314.98	JOD 0.00	JOD 314.98	78	81
2018	1	2	Lima	22,575	m²	JOD 0.00	JOD 221.80	JOD 0.00	JOD 221.80	85	86
2018	1	2	Mike	8,832	m²	JOD 0.00	JOD 71.05	JOD 0.00	JOD 71.05	79	81
2018	1	2	November	7,200	m²	JOD 0.00	JOD 1,466.00	JOD 0.00	JOD 1,466.00	68	76
2018	1	2	Seira	7,200	m²	JOD 0.00	JOD 0.00	JOD 1,364,214.25	JOD 1,364,214.25	1	100
2018	1	3	Cargo	39,600	m²	JOD 641,953.38	JOD 0.00	JOD 7,541,200.00	JOD 8,183,153.38	17	43
2018	1	3	Hotel Apro	43,750	m²	JOD 1,493.64	JOD 0.00	JOD 1,759,743.25	JOD 1,761,236.89	58	60
2018	1	3	Maintenace	59,063	m²	JOD 149,386.20	JOD 0.00	JOD 2,369,494.25	JOD 2,518,880.45	59	69
2018	1	3	New North	39,375	m²	JOD 0.00	JOD 12,038.48	JOD 0.00	JOD 12,038.48	89	92
2018	1	3	New South	40,001	m²	JOD 0.00	JOD 13,456.69	JOD 0.00	JOD 13,456.69	88	88
2018	1	3	Old North	101,250	m²	JOD 837,310.63	JOD 0.00	JOD 18,861,456.00	JOD 19,698,766.63	27	27
2018	1	3	Old South	101,250	m²	JOD 602,209.63	JOD 0.00	JOD 18,916,574.00	JOD 19,518,783.63	28	51
2019	1	1	1	219,600	m²	JOD 0.00	JOD 428,289.19	JOD 0.00	JOD 428,289.19	96	96
2019	1	1	2	219,600	m²	JOD 0.00	JOD 428,289.19	JOD 0.00	JOD 428,289.19	96	96
2019	1	2	Alpha	145,089	m²	JOD 0.00	JOD 252,115.22	JOD 0.00	JOD 252,115.22	97	97
2019	1	2	Bravo	8,832	m²	JOD 0.00	JOD 42,926.52	JOD 0.00	JOD 42,926.52	68	68
2019	1	2	Charli	22,575	m²	JOD 0.00	JOD 39,227.65	JOD 0.00	JOD 39,227.65	97	97
2019	1	2	Delta	22,575	m²	JOD 0.00	JOD 39,227.65	JOD 0.00	JOD 39,227.65	97	97
2019	1	2	Eco	4,050	m²	JOD 0.00	JOD 6,296.73	JOD 0.00	JOD 6,296.73	97	97
2019	1	2	Foxtrot	29,700	m²	JOD 0.00	JOD 0.00	JOD 5,707,716.00	JOD 5,707,716.00	39	100
2019	1	2	Golf	29,700	m²	JOD 0.00	JOD 0.00	JOD 5,949,158.00	JOD 5,949,158.00	34	100
2019	1	2	Hotel	145,089	m²	JOD 0.00	JOD 578,568.88	JOD 0.00	JOD 578,568.88	85	85
2019	1	2	Juliet	3,360	m²	JOD 0.00	JOD 12,379.94	JOD 0.00	JOD 12,379.94	92	92
2019	1	2	Kilo	22,575	m²	JOD 0.00	JOD 77,766.16	JOD 0.00	JOD 77,766.16	79	79
2019	1	2	Lima	22,575	m²	JOD 0.00	JOD 86,342.38	JOD 0.00	JOD 86,342.38	83	83
2019	1	2	Mike	8,832	m²	JOD 0.00	JOD 30,405.50	JOD 0.00	JOD 30,405.50	79	79
2019	1	2	November	7,200	m²	JOD 0.00	JOD 28,025.34	JOD 0.00	JOD 28,025.34	75	75
2019	1	2	Seira	7,200	m²	JOD 0.00	JOD 11,296.25	JOD 0.00	JOD 11,296.25	97	97
2019	1	3	Cargo	39,600	m²	JOD 62,137.29	JOD 0.00	JOD 7,255,809.00	JOD 7,317,946.29	40	40
2019	1	3	Hotel Apro	43,750	m²	JOD 0.00	JOD 0.00	JOD 1,785,300.38	JOD 1,785,300.38	56	100
2019	1	3	Maintenace	59,063	m²	JOD 0.00	JOD 291,944.53	JOD 0.00	JOD 291,944.53	67	67
2019	1	3	New North	39,375	m²	JOD 0.00	JOD 166,215.81	JOD 0.00	JOD 166,215.81	89	89
2019	1	3	New South	40,001	m²	JOD 0.00	JOD 162,708.09	JOD 0.00	JOD 162,708.09	85	85
2019	1	3	Old North	101,250	m²	JOD 2,863,777.50	JOD 0.00	JOD 18,871,168.00	JOD 21,734,945.50	25	25
2019	1	3	Old South	101,250	m²	JOD 115,721.34	JOD 0.00	JOD 7,693,454.50	JOD 7,809,175.84	49	49
2020	1	1	1	219,600	m²	JOD 0.00	JOD 755,296.06	JOD 0.00	JOD 755,296.06	93	93
2020	1	1	2	219,600	m²	JOD 0.00	JOD 755,296.06	JOD 0.00	JOD 755,296.06	93	93
2020	1	2	Alpha	145,089	m²	JOD 0.00	JOD 453,775.19	JOD 0.00	JOD 453,775.19	94	94
2020	1	2	Bravo	8,832	m²	JOD 0.00	JOD 46,394.88	JOD 0.00	JOD 46,394.88	64	64
2020	1	2	Charli	22,575	m²	JOD 0.00	JOD 70,604.77	JOD 0.00	JOD 70,604.77	94	94
2020	1	2	Delta	22,575	m²	JOD 0.00	JOD 70,604.77	JOD 0.00	JOD 70,604.77	94	94
2020	1	2	Eco	4,050	m²	JOD 0.00	JOD 11,485.30	JOD 0.00	JOD 11,485.30	94	94
2020	1	2	Foxtrot	29,700	m²	JOD 0.00	JOD 41,938.39	JOD 0.00	JOD 41,938.39	97	97
2020	1	2	Golf	29,700	m²	JOD 0.00	JOD 45,754.39	JOD 0.00	JOD 45,754.39	97	97
2020	1	2	Hotel	145,089	m²	JOD 0.00	JOD 519,402.53	JOD 0.00	JOD 519,402.53	82	82
2020	1	2	Juliet	3,360	m²	JOD 0.00	JOD 12,933.83	JOD 0.00	JOD 12,933.83	91	91
2020	1	2	Kilo	22,575	m²	JOD 0.00	JOD 80,774.57	JOD 0.00	JOD 80,774.57	77	77
2020	1	2	Lima	22,575	m²	JOD 0.00	JOD 80,128.52	JOD 0.00	JOD 80,128.52	81	81
2020	1	2	Mike	8,832	m²	JOD 0.00	JOD 31,443.33	JOD 0.00	JOD 31,443.33	77	77
2020	1	2	November	7,200	m²	JOD 0.00	JOD 29,101.46	JOD 0.00	JOD 29,101.46	74	74
2020	1	2	Seira	7,200	m²	JOD 0.00	JOD 20,586.01	JOD 0.00	JOD 20,586.01	94	94
2020	1	3	Cargo	39,600	m²	JOD 0.00	JOD 0.00	JOD 7,837,881.50	JOD 7,837,881.50	38	100
2020	1	3	Hotel Apro	43,750	m²	JOD 0.00	JOD 94,075.94	JOD 0.00	JOD 94,075.94	96	96
2020	1	3	Maintenace	59,063	m²	JOD 0.00	JOD 297,302.28	JOD 0.00	JOD 297,302.28	66	66
2020	1	3	New North	39,375	m²	JOD 0.00	JOD 167,656.23	JOD 0.00	JOD 167,656.23	87	87
2020	1	3	New South	40,001	m²	JOD 0.00	JOD 149,269.77	JOD 0.00	JOD 149,269.77	83	83
2020	1	3	Old North	101,250	m²	JOD 3,189,287.25	JOD 0.00	JOD 18,981,394.00	JOD 22,170,681.25	23	23
2020	1	3	Old South	101,250	m²	JOD 77,309.57	JOD 0.00	JOD 10,163,125.00	JOD 10,240,434.57	47	47
2021	1	1	1	219,600	m²	JOD 0.00	JOD 928,063.75	JOD 0.00	JOD 928,063.75	89	89
2021	1	1	2	219,600	m²	JOD 0.00	JOD 928,063.75	JOD 0.00	JOD 928,063.75	89	89
2021	1	2	Alpha	145,089	m²	JOD 0.00	JOD 586,444.25	JOD 0.00	JOD 586,444.25	91	91
2021	1	2	Bravo	8,832	m²	JOD 0.00	JOD 55,786.94	JOD 0.00	JOD 55,786.94	60	60
2021	1	2	Charli	22,575	m²	JOD 0.00	JOD 91,247.30	JOD 0.00	JOD 91,247.30	91	91
2021	1	2	Delta	22,575	m²	JOD 0.00	JOD 91,247.30	JOD 0.00	JOD 91,247.30	91	91
2021	1	2	Eco	4,050	m²	JOD 0.00	JOD 15,348.54	JOD 0.00	JOD 15,348.54	92	92
2021	1	2	Foxtrot	29,700	m²	JOD 0.00	JOD 77,091.23	JOD 0.00	JOD 77,091.23	95	95
2021	1	2	Golf	29,700	m²	JOD 0.00	JOD 83,529.53	JOD 0.00	JOD 83,529.53	94	94
2021	1	2	Hotel	145,089	m²	JOD 0.00	JOD 500,610.75	JOD 0.00	JOD 500,610.75	79	79
2021	1	2	Juliet	3,360	m²	JOD 0.00	JOD 13,405.48	JOD 0.00	JOD 13,405.48	91	91
2021	1	2	Kilo	22,575	m²	JOD 0.00	JOD 86,517.04	JOD 0.00	JOD 86,517.04	75	75

Year	Network	Branch	Section	SectionArea	AreaUnit	Sum of Stop Gap	Sum of Preventive	Sum of Major	Sum of Total	PCI Before Average	PCI After Average
2021	1	2	Lima	22,575	m²	JOD 0.00	JOD 77,601.52	JOD 0.00	JOD 77,601.52	79	79
2021	1	2	Mike	8,832	m²	JOD 0.00	JOD 33,498.40	JOD 0.00	JOD 33,498.40	75	75
2021	1	2	November	7,200	m²	JOD 0.00	JOD 30,215.78	JOD 0.00	JOD 30,215.78	73	73
2021	1	2	Seira	7,200	m²	JOD 0.00	JOD 27,446.77	JOD 0.00	JOD 27,446.77	91	91
2021	1	3	Cargo	39,600	m²	JOD 0.00	JOD 53,069.54	JOD 0.00	JOD 53,069.54	97	97
2021	1	3	Hotel Apro	43,750	m²	JOD 0.00	JOD 161,895.06	JOD 0.00	JOD 161,895.06	92	92
2021	1	3	Maintenace	59,063	m²	JOD 0.00	JOD 303,440.16	JOD 0.00	JOD 303,440.16	65	65
2021	1	3	New North	39,375	m²	JOD 0.00	JOD 159,143.20	JOD 0.00	JOD 159,143.20	85	85
2021	1	3	New South	40,001	m²	JOD 0.00	JOD 138,931.89	JOD 0.00	JOD 138,931.89	80	80
2021	1	3	Old North	101,250	m²	JOD 3,482,899.75	JOD 0.00	JOD 19,124,260.00	JOD 22,607,159.75	21	21
2021	1	3	Old South	101,250	m²	JOD 0.00	JOD 0.00	JOD 12,949,023.00	JOD 12,949,023.00	45	100
2022	1	1	1	219,600	m²	JOD 0.00	JOD 912,247.19	JOD 0.00	JOD 912,247.19	86	86
2022	1	1	2	219,600	m²	JOD 0.00	JOD 912,247.19	JOD 0.00	JOD 912,247.19	86	86
2022	1	2	Alpha	145,089	m²	JOD 0.00	JOD 620,218.44	JOD 0.00	JOD 620,218.44	88	88
2022	1	2	Bravo	8,832	m²	JOD 0.00	JOD 0.00	JOD 359,062.59	JOD 359,062.59	56	100
2022	1	2	Charli	22,575	m²	JOD 0.00	JOD 96,502.36	JOD 0.00	JOD 96,502.36	88	88
2022	1	2	Delta	22,575	m²	JOD 0.00	JOD 96,502.36	JOD 0.00	JOD 96,502.36	88	88
2022	1	2	Eco	4,050	m²	JOD 0.00	JOD 17,227.16	JOD 0.00	JOD 17,227.16	89	89
2022	1	2	Foxtrot	29,700	m²	JOD 0.00	JOD 105,206.98	JOD 0.00	JOD 105,206.98	92	92
2022	1	2	Golf	29,700	m²	JOD 0.00	JOD 111,880.14	JOD 0.00	JOD 111,880.14	92	92
2022	1	2	Hotel	145,089	m²	JOD 0.00	JOD 544,717.06	JOD 0.00	JOD 544,717.06	76	76
2022	1	2	Juliet	3,360	m²	JOD 0.00	JOD 13,789.05	JOD 0.00	JOD 13,789.05	90	90
2022	1	2	Kilo	22,575	m²	JOD 0.00	JOD 93,679.24	JOD 0.00	JOD 93,679.24	73	73
2022	1	2	Lima	22,575	m²	JOD 0.00	JOD 80,539.63	JOD 0.00	JOD 80,539.63	77	77
2022	1	2	Mike	8,832	m²	JOD 0.00	JOD 36,123.46	JOD 0.00	JOD 36,123.46	74	74
2022	1	2	November	7,200	m²	JOD 0.00	JOD 31,324.28	JOD 0.00	JOD 31,324.28	72	72
2022	1	2	Seira	7,200	m²	JOD 0.00	JOD 30,673.93	JOD 0.00	JOD 30,673.93	89	89
2022	1	3	Cargo	39,600	m²	JOD 0.00	JOD 97,846.80	JOD 0.00	JOD 97,846.80	95	95
2022	1	3	Hotel Apro	43,750	m²	JOD 0.00	JOD 187,358.16	JOD 0.00	JOD 187,358.16	88	88
2022	1	3	Maintenace	59,063	m²	JOD 0.00	JOD 311,457.94	JOD 0.00	JOD 311,457.94	64	64
2022	1	3	New North	39,375	m²	JOD 0.00	JOD 146,935.67	JOD 0.00	JOD 146,935.67	83	83
2022	1	3	New South	40,001	m²	JOD 0.00	JOD 139,283.80	JOD 0.00	JOD 139,283.80	78	78
2022	1	3	Old North	101,250	m²	JOD 3,741,887.50	JOD 0.00	JOD 19,233,212.00	JOD 22,975,099.50	19	19
2022	1	3	Old South	101,250	m²	JOD 0.00	JOD 119,542.57	JOD 0.00	JOD 119,542.57	98	98

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"Case Study"

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This Thesis was submitted in Partial Fulfillment of the Requirements for the Master's Degree in Engineering Project Management

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