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IMPACT OF CONTRAT CONDITIONS ON CONSTRUCTION PROJECTS

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1. INTRODUCTION¹

Construction industry is one of the largest industries in Kosovo. It is one of the biggest businesses which belong to the private sector. There are six hundred and twenty (620) local construction companies licensed for construction works, 0.31% among 2 million inhabitants.

In the last years the construction industry has become one of the most important sectors behind Kosovo's economic growth. Mainly financed through the foreign aid, the construction sector in Kosovo has absorbed some several hundred million Euros that were primarily used for the construction of new homes or rehabilitation and development of the road infrastructure.

The construction boom has not lost any pace, and still represents a highly attractive sector for potential investors in Kosovo. Roughly estimated, in order to meet the existing market demand Kosovo will need in the next years some 60,000 new apartments including infrastructure, such as roads, kindergartens, schools, leisure restaurants etc. A factor, which helps to boost the development of this sector, is the demand for road construction.

Construction of residential buildings remains one of the most profitable businesses in Kosovo.

Many of largest projects fall in the heavy construction area (highways, bridges and other public works).

The Government of Kosovo has set itself a goal to connect the country from three main directions with the most important international road corridors in Macedonia, Albania and Serbia.

The construction of a highway, which will connect the northern part of Kosovo with Skopje/Macedonia, is a mid-term goal of the government. A much more important project represents the building of a highway between Merdare-Kukes-Durres, which will connect

¹ <http://www.invest-ks.org/?cid=2,21> , *Government of Kosova (15/06/2009)*

Kosovo with the seaport of Durrës, Albania. This highway will become a part of the Trans European Corridor that will connect the Adriatic Sea with the Western Europe.

Improvements of the road infrastructure and the construction of the highway to Albania will be financed through foreign investments.

The construction profession is regulated by governmental licensing (ministry of trade and industry) Construction department Enterprises licensing for construction works, enterprises for production the construction materials, projecting enterprises and laboratories for tests examination of construction products.

1.1 ²Survey of Construction Projects Initiated in Different Municipalities in Kosova

The main divisions of the construction industry consist of building construction also called “vertical construction” and heavy construction also called “horizontal construction”. The distribution of total Kosovo construction for year 2010 from annual report compiled by reports from the municipalities of Kosovo is illustrated in Figures below.

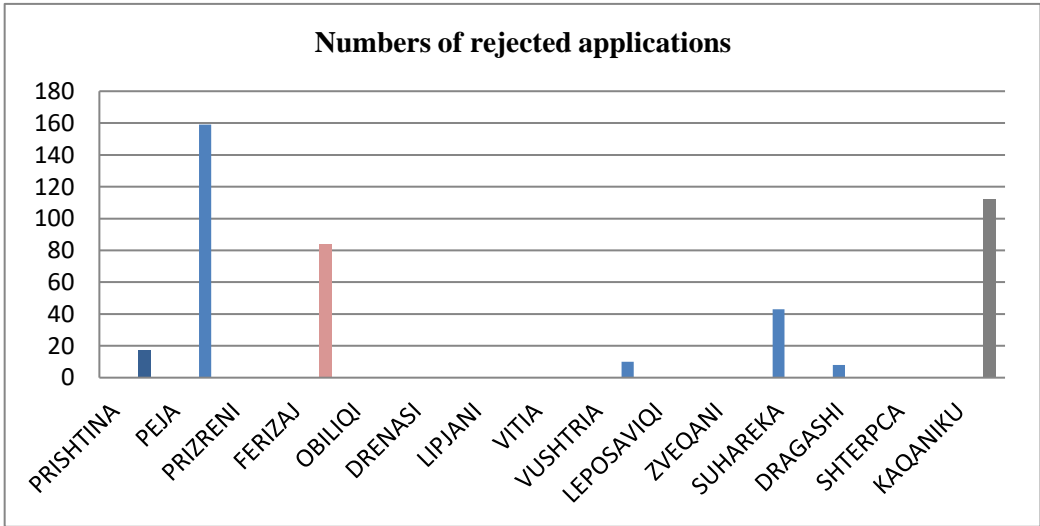


Figure 1. Rejected Applications (Source: Department of Urbanism, annual report 2010-2011 construction inspectorate)

² http://www.usaid.gov/kosovo/pdf/construction_sector_report.pdf, USAID (15/06/2009)

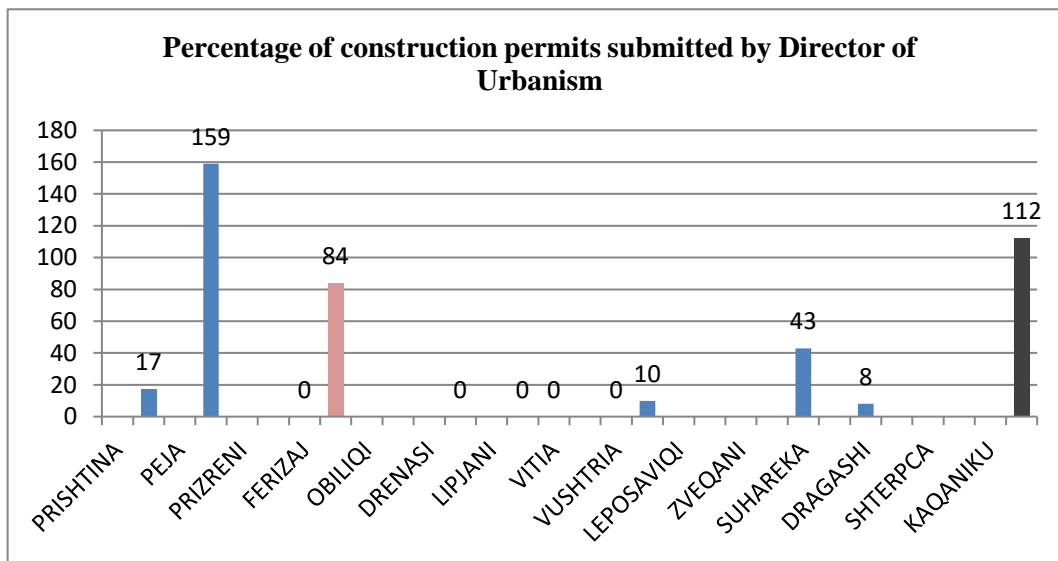


Figure 2. Construction Permits submitted to Department of Urbanism (Source: Department of Urbanism, annual report 2010-2011 construction inspectorate)

1.2 Civil Engineering Works³

Construction is a discipline of art and science. Understanding the technical aspects of construction, business, management aspects and profession are essential.

Almost all civil engineering structures are unique. They have to be designed for some specific purpose at some specific location before they can be constructed and put to use.

Consequently the completion of any civil engineering project involves five stages of activity which comprise the following:

1. Defining the location and nature of the proposed works and the quality and magnitude of the service they are to provide;
2. Obtaining any powers and permissions necessary to construct the works;
3. Designing the works and estimating their probable cost;
4. Constructing the works;

³ Nunnally, S.W.J.(2007). "Construction Methods and Management" page 1-16

5. Testing the works as constructed and putting them into operation.

There are inherent risks arising in this process because the design, and therefore the estimated cost of the works, is based on assumptions that may later have to be altered. The cost can be affected by the weather during construction and the nature of the ground or groundwater conditions encountered.

Elements of Construction Management: The construction manager manages the fundamental resources of construction. These resources include: workers, subcontractors, equipment, construction plant, material, funds and time. Skill full construction manager complete the project on time and within budget. Bad construction manager results are:

- a) Project delays that increase labors and equipment cost;
- b) High material costs caused by poor purchasing;
- c) Increased subcontractor cost and poor subcontractor relations;
- d) Low profit.

Quality Management: Quality Management must take place in all construction projects to ensure that the constructed projects meet the requirements established by architect, designer and engineer in projects plans and specifications. The terms quality management and quality assurance have been adopted to include all aspects of producing and accepting a construction project which meets all required quality standards.

Quality management includes such activities as specifications development, process control, product acceptance, and laboratory and technician certification, training, and communication.

Quality control which is part of quality management process is primarily concerned with the process control function. The contractor is primarily responsible for construction quality. Quality assurance inspections and tests performed by investor's representatives by spots checks to verify that some particular aspect of the project meets minimum standards.

1.3 Description of Construction Project Development and Contract Procedures⁴

The steps in the construction contracting process include bid solicitation, bid preparation, bid submission, contract award and contract administration. Major steps in the project development process include:

1. Recognize the need for the project.
2. Determining the technical and financial feasibility of the project.
3. Preparing detailed plans, specifications and cost estimates for the project.
4. Obtaining approval from regulatory agencies.

The most important methods by which facilities are constructed:

1. Construction employing and construction force.
2. Owner management of construction.
3. Construction by a general contractor.

Many large company and organizations possess their own construction forces. More frequently owners utilize their construction staffs to manage their new construction. The work may be carried out by workers hired directly by the owner, by specialty contractors or by combination of these two methods.

Construction by a general contractor operating under a prime contract is probably the most common method of having a facility constructed.

In two methods: design/build and construction management contract, the owner contracts with a firm to both design and build a facility. Such contracts are frequently utilized by construction firms that specialize in a particular type of construction and possess standard designs. When the same organization is both designing and building the facility, coordination problems are minimized.

Disadvantage of the design build concept is the difficulty of obtaining competition between suppliers and the complexity of evaluating their proposals.

In construction management contract, the professional project manager acts as the owner's investor to direct both the design and the construction of facility

51.4 Construction Contracts

One of the most frequently encountered risks in civil engineering construction is that the ground conditions met during construction will not be as expected, because trial boreholes and test pits cannot reveal the nature of every cubic metre below ground level. This means that quantities of excavation, filling, rock removal and concrete, etc., for such as the foundation of structures or laying of pipelines actually found necessary may differ from those estimated. The risk that the investor will need changes also arises from the relatively long time it takes, often 2 years or more, to get a civil engineering project designed and constructed. During this time it is always possible for newer processes or equipment to be developed which the investor needs to incorporate in the works, or there may be revised forecasts of demand for the project output. The traditional way of dealing with these risks of change is for the design of the works to be completed first, and then to produce a construction contract for which civil engineering contractors are invited to tender. The price bidders tender for such a contract is based on a bill of quantities which lists the estimated quantities of each type of work to be done, 'taken off' (i.e. measured) from the completed drawings of the works required. Against each item a contractor bids his price per unit quantity thereof, and these, multiplied by the estimated quantity of work to be done under each item, when totalled form 'the Contract Sum'. This system permits the contractor to be paid pro rata to the amount of work he actually does under each item, and also eases valuation of the payment due to the contractor for executing changes to the design of the works during construction to overcome some unforeseen difficulty or make an addition. The investor can thus make reasonably small alterations or additions to the works required during the construction period – provided these are not so extensive as to 'change the nature of the contract'.

⁵ *Twort,A.,Rees,G.(2004). Civil Engineering Project Management. Page 51-90*

A standard form of contract using the ‘bill-of-quantities method’ known as the FIDIC Conditions, was developed by the International Federation of Consulting Engineers for worldwide use

A basic provision of these standard forms is that the contract between the investor and the contractor for construction of the works is administered by an independent third party – ‘the Engineer’ – who has the responsibility of seeing that the provisions of the contract are fairly applied to both investor and contractor. The Engineer has power to ensure the contractor’s work is as the contract requires and issues certificates stating how much the investor is obligated to pay under the terms of the contract. This avoided the bias that might occur if either the investor or contractor decided these matters.

1.5 ⁶Conditions published by the International Federation of Consulting Engineers (FIDIC)

The FIDIC ‘Red Book’ Conditions, 4th Edition are intended to apply to civil Engineering work worldwide. These conditions were accepted by the major lending agencies who recommend or require their use together with additional clauses and amendments proposed by the agencies. An important requirement in FIDIC is that the engineer is specifically required to consult with both the employer and the contractor before making a decision on a contractor’s claim for additional payment or extension of the contract period. Another provision of importance is contained which allows for adjustments to payment with respect to the contractor’s overheads if the value of extra works ordered exceeds 15 per cent of the tendered sum excluding day works and provisional items.

In 1999 FIDIC published four new forms. The first is a Contract for Construction to replace the Red Book. Much of the text and the concepts have remained but the whole is re-organized into what was considered a more logical sequence of clauses. The role of the independent engineer is retained who again has to consult with both parties to try to reach agreement on claims and the like, but if this is not possible, to ‘make a fair determination in

⁶ *Twort,A.,Rees,G.(2004). Civil Engineering Project Management. Page 51-90*

accordance with the Contract, taking due regard of all relevant circumstances'. The engineer's duty to make final decisions on disputed matters is replaced.

Additionally FIDIC produced in 1999 a radically different form for engineer, procure and construct (EPC)/Turnkey Projects. Under this form the contractor takes over full responsibility for design and construction including any requirements of the employer, and undertakes to produce works which achieve the desired result. There is no independent engineer but an employer's representative who carries out various administrative and payment functions. FIDIC have also produced a short form of contract for short-term projects of a fairly simple nature handled directly by the employer's staff

1.6 ⁷Roles of the Key Participants in a Construction Contract

A construction contract is made between two parties only – 'the Employer' and 'the Contractor'. Their roles are defined in the contract. However, because there is a need for day-to-day supervision of civil engineering construction, the two parties may agree that a third person should carry out such duties. This third person can have varying powers under the contract and this is reflected in his designation. He can be designated 'the Engineer' under the contract; or he may be designated 'the Project Manager' or 'Employer's Representative' in both cases occupying a distinctly different position from 'the Engineer'. The roles of these participants are described briefly below; the use of a capital letter in their designation being discontinued except where necessary for clarity. The employer, referred to as 'the purchaser' in some conditions of contract, initiates the process of acquiring the works. He sets down what he requires and specifies this in the tender documents, which he issues to firms of contractors to seek their offers to carry out the works. His obligations include ensuring that the works are legally acceptable and practical, and that the site for them is freely available. He may also need to arrange that associated needs, such as the supply of power, drainage and the like which he is providing, are available. Having set up these basic elements he must, above all, ensure that he can meet his obligation to pay the contractor in accordance with the contract. If any dispute remains unresolved under the contract, the employer must decide what action to take; either to negotiate some settlement or, perhaps, take the dispute to adjudication, arbitration or the courts. The contractor takes

⁷ Twort, A., Rees, G. (2004). *Civil Engineering Project Management*. Page 51-90

on the obligation to construct the works. In his offer to the employer he puts himself forward as being able to build the works to the requirements set out in the tender documents. In order to do this he will have studied the documents and any geotechnical or other information provided or otherwise available, visited the site and checked the availability of such labor, plant and materials as may be needed. Once his offer is accepted and the contract is formed the contractor takes on the obligation of doing all and anything needed to complete the works in accordance with the contract, regardless of difficulties he may encounter. He is responsible for all work done by his sub-contractors and suppliers, and any design work the contract requires him to undertake. The engineer designated in the traditional form of contract under FIDIC conditions has a role independent of the employer and the contractor. He is not a party to the contract; but he is named in it with duties determined by the parties. Although he is appointed (and paid) by the employer, he has to supervise the construction of the works. as an independent person, making sure they accord with the specified requirements. He also acts as an independent valuer of what should be paid to the contractor, and as a decider of issues arising in the course of construction. The engineer will normally be an experienced and qualified professional whose knowledge and standing should be sufficient to assure both employer and independently and impartially. In the most widely used conditions of contract, decisions made by the engineer can be accepted by the parties to the contract; but, if either party should so choose, the engineer's decisions can be challenged and if need be taken to external decision. This ability to challenge the engineer's rulings can be seen as supporting the effectiveness of his role. Given efficient contract documents and completion of the designs before construction starts, the appointment of an independent engineer to administer the contract encourages contractors to submit their keenest prices. Many contractors will seek out the reputation of such an engineer for his experience and ability to apply fair dealing, and will adjust their prices accordingly. This benefits both the employer and contractor since it gives assurance that their interests will be protected. It also facilitates the resolution of any constructional problems that arise, so that disputes arising over contractors' claims are rare. Few civil engineering contracts handled in this manner need settlement by resort to arbitration or a court of law. A project manager holds a different appointment from the independent engineer described above. He may carry out many similar duties as the engineer under the traditional form of contract, but he is not fully independent. The specific content of the contract will define the limit of his powers to act independently. Decisions made by the

project manager on matters that are subject to assent by the employer will commit the employer, who will not be able to dispute them. From the contractor's point of view, the project manager's decisions will be regarded as the employer's; so he may feel it necessary to increase his prices to cover the risk the employer might tend to interpret the contract in his own favor. If the contractor is to offer his lowest prices he has to be assured the terms of the contract will be interpreted impartially; for this reason an adjudicator is appointed to whom the contractor can take his disputes with the project manager. The supervisor has a role which is mostly restricted to watching over construction and attending tests, etc. although he has some powers to issue instructions and for correction of defects. The resident engineer is the engineer's representative or an assistant of the engineer under FIDIC. He may be delegated some of the engineer's powers depending on his experience and the type of work as well as the remoteness of the site from the engineer's office. His main role, however, is to ensure the works are carried out as required by the contract.

1.7 ⁸Writing Specifications

In writing specifications care must be exercised to ensure consistency of requirements throughout and conformity with what is written in other documents. This consistency can be promoted if one person drafts all the documents or, if parts are written by others, one person carefully reads through the whole finished set of documents. An inconsistency in the documents can give rise to a major dispute under the contract, having a serious effect on its financial outcome.

Some guiding principles are as follows.

- a) The layout and grouping of subjects should be logical. These need planning out beforehand.
- b) Requirements for each subject should be stated clearly, in logical order, and checked to see all aspects are covered.
- c) Language and punctuation should be checked to see they cannot give rise to ambiguity.

⁸ *Twort, A., Rees, G. (2004). Civil Engineering Project Management. Page 51-90*

- d) Legal terms and phrases should not be used.
- e) To define obligations the words ‘shall’ or ‘must’ (not ‘should’ or ‘is to’, etc.)
- f) Quality must be precisely defined, not described as ‘best’, etc.
- g) Brevity should be sought by keeping to essential matters.

It is not easy to achieve an error-free specification. It is of considerable assistance to copy model clauses that, by use and modification over many previous contracts, have proved satisfactory in their wording.

. Entirely new material is quite difficult to write and will almost certainly require more than one attempt to get it satisfactory. The specification has to tell the contractor precisely:

- a) the extent of the work to be carried out;
- b) the quality and type of materials and workmanship required;
- c) where necessary, the methods he is required to use, or may not use, to construct the works

Under the first an informative description is given of what the contractor is to provide and all special factors, limitations, etc. applied. Under the second the detailed requirements are set out. The extent of detail adopted should relate to the quantity and importance of any particular type of work in relation to the works required. Thus the specification for concrete quality may be very extensive where much structural concrete is to be placed; but it may be quite short if concrete is only required as bedding or thrust blocks to a pipeline. A ‘tailormade’ specification appropriate to the nature of the work in the contract should be the aim. Repetition of requirements should be avoided. If requirements appear in two places, ambiguity or conflict can be caused by differences of wording. Also there is a danger that a late alteration alters one statement but fails to alter its repetition elsewhere.

1.8 The specification of General Requirements⁹

A specification usually comprises two distinct parts – Part 1: all the general requirements, and Part 2: the quality of workmanship and materials required. The general requirements can usually be classified into four categories:

- a) scope of work and reference standards;

⁹ *Twort, A., Rees, G. (2004). Civil Engineering Project Management. Page 51-90*

- b) drawings and documents;
- c) site details and data;
- d) completion and testing.

Under the first, the specification should provide a brief but reasonably comprehensive description of the works to be built. The elements making up the whole project should be mentioned, together with their principal sizes or, where relevant, outputs. (This is of assistance to those who might wish to use the priced contract later for the purpose of analyzing costs.) The services which the contractor is to provide may need description, particularly if he is to design any part of the works. The services which the employer and/or other contractors are to provide must be defined. Explanation should be given of the industry or national standards used on the project, and in what circumstances alternatives may be allowed. The second section should include:

- a) list of drawings provided by the employer to accompany the contract;
- b) requirements for any drawings and explanation of methods of construction the contractor is to produce, in order that sufficient information is provided for the employer to decide whether such work is as specified and conforms to all safety measures required;
- c) the timing of submission of the contractor's drawings and what time is allowed for the engineer to examine same and respond;
- d) other information required from the contractor such as – test results on materials and items of plant the contractor is to provide including manufacturers' drawings, maintenance and operation manuals
- e) an example of the form in which claims for interim payment should be submitted.

The third section will contain much information about the site and relevant data, such as

- a) description of site and access, working areas;
- b) statutory requirements e.g. work in public roads, Health & Safety Act, Control of Pollution Act, etc.;

- a) water and power supplies available, sanitation, sewerage and solid waste disposal;
- b) contractor's offices;
- c) engineer's offices, attendance on engineer, vehicles for engineer, telephones;
- d) temporary fencing, watching;
- e) setting out data;
- f) geological and hydrological data.

The geological and hydrological data presented is of crucial contractual significance.

The contractor has to base his prices on what is reasonably foreseeable;

1.10 ¹⁰The Role of the Employer's Engineer

The employer appoints an independent engineer to administer the contract for construction termed 'the Engineer' under the contract. This engineer is required under the FIDIC conditions to 'act impartially within the terms of the contract having regard to all the circumstances' He (or she) may often be a consulting engineer engaged by the employer, or can be a member of the employer's staff, but this does not affect the duty to act impartially. The advantage of employing an engineer who has to administer the contract impartially is that both the employer and the contractor can expect their interests to be dealt with fairly. Also when the contractor can expect fair payment for extra work ordered or arising from some unforeseen trouble, his risks are reduced, thus enabling him to submit his keenest prices. Both the employer and the contractor can, however, challenge any decision of the engineer by taking the matter in dispute to a conciliation procedure, adjudication, or to arbitration for settlement. Since the employer does not administer the contract he cannot issue an instruction direct to the contractor, he can only request the engineer to do so. But the engineer is bound by the terms of the contract, so if he finds he has no power to implement the employer's request, or thinks to do so would amount to an unfair administration of the contract, then the employer has to put his request direct to the contractor for settlement outside the terms of the contract. This rarely happens, but as an example, if the employer wants the contractor to stop working for a day so that he can bring a party of visitors on site to view the construction, he has to seek the contractor's agreement

¹⁰ Twort,A.,Rees,G.(2004). *Civil Engineering Project Management*. Page 51-90

to this because the engineer usually has no power to order this. The engineer's duties set out under the contract are extensive.

1.11 Contract Types According to Kosova Procurement Law ¹¹

Contracts may be classified in several ways. A contract having as its principal object the provision of a professional construction-related service (e.g., architectural and/or engineering services, geotechnical or geodetic site investigation services, structure or structure design assessment services, or construction supervision or construction management services) shall be considered a service contract even if such contract also covers, by way of addition to such principal object, the performance of one or more activities referred to in the definition of "works contract."

A contract having as its principal subject the conduct of activities referred to in the definition of "works contract," but that also covers the provision of professional construction-related services, shall be considered a "works contract" if such services are necessary for the performance of such contract.

A contract that has as its subject both the supply of products and the conduct of activities referred to in the definition "works contract" shall be classified as a "works contract" unless such activities consist only of sitting and/or installation activities. Any contract, regardless of its structure, that in substance provides that an economic operator is to receive or retain a commission or other form of compensation for the performance of sales or collection services for or on behalf of a contracting authority is a "service contract" covered by the law.

Public Contract: The Procurement Officer of a contracting authority shall be the only person authorized to enter into or sign a public contract on behalf of such contracting authority. A public contract that is not signed by the contracting authority's Procurement Officer shall be void and unenforceable. A public contract signed by a Procurement Officer in violation or in disregard of an order or notification received from the Procurement Review Body, a review panel or a court of competent jurisdiction shall be void and unenforceable.

¹¹ *Law on public procurement in Kosovo, (2008) page 60-97*

A contracting authority shall specify in the contract notice and the tender dossier either that the contract shall be awarded to the economic operator submitting the lowest-priced tender or that the contract shall be awarded to the economic operator submitting the most economically advantageous tender.

If the contracting authority has specified that the award of a public contract shall be made to the economic operator submitting the most economically advantageous tender, such contracting authority shall specify in the tender dossier the criteria for determining the winning tender and the weighting assigned to each criterion.

To the greatest extent practicable, the contracting authority shall specify each criterion in an objective and quantifiable manner and express the weighting assigned thereto in monetary terms. In specifying such criteria, a contracting authority shall ensure that such criteria are directly linked to the objects and requirements of the concerned public contract.

Contract Times: The time allowed for completion of a construction project is normally specified in the contract. If no completion date is specified a reasonable time, as interpreted by the courts. If the completion date is included in a contract and the project is not completed within the specified date, the contractor is liable for any damages (monetary loss) incurred by the owner as the result of late completion.

A liquidated damages clause in the contract may be used to simplify the process of establishing the amount of damages resulting from late completion. Such a clause with specify the amount of damages to be paid by the contractor to the owner for each day of late completion.

Construction contracts normally contain provision for time extensions to the contract due to circumstances beyond to increase the bid price to cover such risks.

Bid Procedure:

In Kosova and in region the construction contracting is a very competitive business. To prosper and grow, a construction company you must achieve reputation for quality and workmanship and timely completion while achieving reasonable returns on its capital investments. Profit is a reason and principal motive for bidding on a construction contract. There are other reasons why a contractor may bid on a project. For example: During times of low construction activity, contractors may submit bids with little or no profit in order to keep

their equipment in operation and prevent the loss of skilled workers and managers. This method is successful on a short-term basis; it will lead to financial disaster if long continued.

Bidding Procedures:

The principal steps in the bidding procedure for a construction contract are solicitation, bid preparation, bid submission, bid opening and contract award.

Law in Public Procurement in Kosovo is required to solicit bids by public advertising. To ensure adequate competition, at least three bids shall be obtained. Tenders received in a procurement activity conducted using the procedures specified in law shall only be opened publicly. A contracting authority shall specify both the location and the time for the public opening of tenders in the contract notice and in the tender dossier”.

Contract Award Criteria

According to law in public procurement a contracting authority shall make an award of a public contract to the economic operator submitting the lowest-priced tender.

The contracting authority has specified in the tender dossier that the award of a public contract shall be made to the economic operator submitting the most economically advantageous tender, such award shall be made only on the basis of the criteria and weighting that have been specified in the tender dossier .

2. ANALYSIS

2.1 Summary of Project

Prishtina International Airport was built during the 60's and was originally intended for air force purpose with limited commercial traffic. Since January 2000, when it was reopened after the war, it was developed from a military and humanitarian facility to a dynamic civil aviation airport. It handled more than 945 000 passengers in 2004, making it the most important airport in the region in terms of passengers.

In order to get airport certificate there are some International Civil Aviation Organization "ICAO" Annexes requirements that must be fulfilled.

During the audits from inspectors where found lot of nonconformities related to strengthening and resurfacing of Airport, apron extension, widening of the main taxiway etc.

The Airport authority has hired an international company as manager of the reconstruction works. The aim of these major investment projects was to correct nonconformities stated in audit reports related to licensing the airport, where the requirements of ICAO Annex 14 must be met.

2.2 Particulars of the Aerodrome Site¹²

The aerodrome essentially accommodates two types of activities: civilian and military traffic. The military traffic consists of military aircraft and helicopters in support of KFOR intervention in Kosovo.

Services and installations for civilian traffic are concentrated on the north-western side of runway 17/35, in line with the threshold of runway 17. That area encloses the main passenger apron (Delta Apron) and corresponding air terminal, departure, the arrival terminal, management building, the cargo building, and the fuel farm.

¹² *Prishtina International Airport "Aerodrome Services and Operation Manual" page 6*

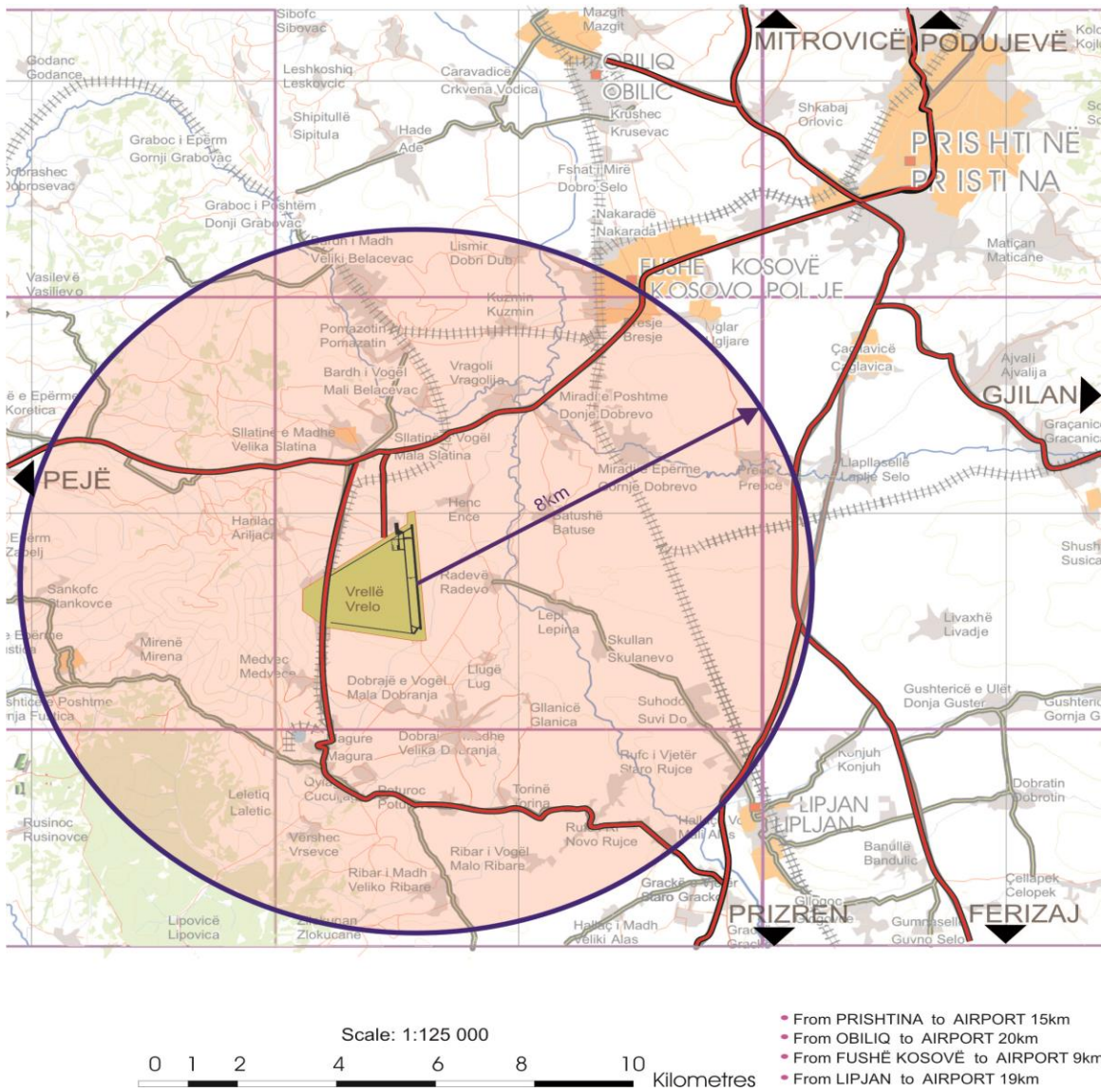


Figure 4. Plan of the Airport in relation to Prishtina, (Source: Prishtina International Airport “Aerodrome Services and Operation Manual”)

3.0 CASE STUDY ANALYSIS¹³

In Runway Resurfacing project Contract are include all general works preparatory to the resurfacing to the Runway and Taxiways at Pristina International Airport, and general works, materials and works of any kind necessary for the due and satisfactory construction, completion and maintenance of the Works to the intent and meaning of the drawings and Specification, further drawings and data to be prepared by the Contractor, and further drawings and orders that may be issued by the Engineer from time to time, compliance by the Contractor with the General Conditions of Contract, all materials, apparatus, plant machinery, tools, fuel, water, strutting, timbering and tackle of every description ; transport, offices, stores, workshops, staff, labors lighting and watching required for the safety of the public and protection of the Works and adjoining land ; first aid equipment, sanitary accommodation for the staff and workmen, the effecting and maintenance of all insurance, the payment of all wages, salaries, fees, royalties, duties or other charges arising out of erection of the Works and the regular clearance of rubbish, reinstatement and clearing up and leaving the site in good condition.

Civil Engineering Standard Method of Measurement, third edition is used for measurement.

3.1 Method of Executing of Construction Works

The Contractor shall adopt a method of working approved by the Engineer, but any approval that may be given will not relieve the Contractor of his responsibility for the proper execution and safety of the Works in the Airport.

The method of working shall take into consideration the daily activity of Pristine Airport.

Construction work restricting aircraft movements according to the safety regulations in force must not be carried out. Such work must be planned and executed during periods when the airport is closed for air traffic, i.e. between 22.00 and 06.00 hrs.

¹³ *Runway Resurfacing Project*

However, all construction work must be completed, all plant removed and the airport ready for safety inspection by 05.00 hrs. In addition the Contractor may apply for additional work hours between 18.00 and 22.00 hours, during which period he normally could expect to have 3 working hours, subject to the approval by and instructions from the tower by radio. The Contractor should be prepared to open the working area for air traffic 15 minutes after request from traffic control during these 3 hours.

If circumstances arise which, in the opinion of the Engineer, necessitate a change in the method of working or the suspension of the use of any part of the plant, either temporarily or permanently, and notwithstanding the previous approval of the Engineer of the method of working or the type, size and manner of using such plant, either in the portion of the Works affected, or on any other portion of the Works, the Contractor shall immediately adopt another approved method of working or other approved plant, and shall have no claim against the Airport Authority for costs incurred by him in changing the method of working, the suspension of use of any part of the plant, or in the provision and use of such other plant.

Where a method of construction for a particular section of the Works is detailed or specified in the Contract Documents or is reasonably to be inferred there from, the Contractor shall at all times observe such method of construction unless he shall previously have obtained the approval of the Engineer for an alternative method of construction. Unless the Engineer should, at the time of giving approval to a variation in the method of construction, at the same time give approval to a variation in the cost of carrying out such work, then such work shall be paid for as if it has been executed by the method of construction detailed, specified in or reasonably to have been inferred from the Contract Documents.

3.2 Program for the Execution of the Works

In accordance with the terms of the General Conditions of the Contract, the Contractor shall submit to the Engineer within 14 days of the signing of the Contract a fully detailed program showing the order, the procedure and method by which he proposes to carry out the construction and completion of the Works.

The Contractor shall liaise with any contractor or subcontractor appointed at the airport in order to coordinate with their work programs. Any dispute between different parties shall be reported to and settled by the Engineer, whose decision shall be final and binding for all parties.

The information to be supplied to the Engineer shall include drawings showing the general arrangement of the temporary offices and any other temporary buildings or structures which he proposes to use, together with details of the constructional plant and temporary works, and all other devices which he proposes to adopt for the construction and completion of the whole of the works and, in addition, details of the labor strength, skilled and unskilled, and supervision arrangements.

The whole of temporary works, plant equipment and appliances used on the Works shall be the liability of the Contractor and in regard to construction, sufficiency, safety and maintenance and approval by the Engineer shall in no way relieve the Contractor of this liability.

The manner and order in which it is proposed to execute the permanent Works is subject to adjustment and approval by the Engineer, and the Contract price shall be held to include for any necessary adjustments require by the Engineer during the course of the work.

3.3 Construction Site

The Contractor shall submit for approval, the complete layout of the compound with elevations of plant and buildings.

The Contractor has not unlimited access to the working site. In addition to the restrictions due to airport safety and security referred to in the Conditions of Contract the Engineer may change the boundaries of the work site as the work is progressing. The Contractor will be deemed to have visited the Site before tendering and to have discussed the Works with the Police, the Local Authority, the Statutory Authorities and the Employer's

Representative as necessary to satisfy himself on all aspects of the Contract, including inter-alia, access restrictions on times and routes for delivery and carting away, access to facilities and services (water, sewage, electricity, telephone) the proximity of adjacent buildings, the presence and conditions of trees and other vegetation over the site, etc the conditions under which the work will be carried out, the limitations on methods of working and equipment which may be necessary due to high water tables and to avoid noise and dust levels unacceptable to the public and air operations in the vicinity, the location of equipment compound, laboratory and offices as well as safety, operational and security procedures and all other matters which will affect the works

Land outside site boundaries: Where it for any reason is necessary for the Contractor to get access to land outside the site boundaries the Contractor must obtain the approval and written consent of the landowner prior to entering such land. Any compensation required will be the Contractor's obligation.

All necessary precautions shall be taken to protect the Works from the effect of Weather. Materials or works damaged by water shall be removed and replaced at the Contractor's expense.

Dangerous and flammable materials: The provision and use of explosives are strictly forbidden. Flammable materials such as liquid gas may only be used on site with prior approval and only if the requisite safety measures are observed at all times. Storage of such materials is restricted to the Contractor's compound. Welding on site requires the approval by the Employer's Airport Fire Officer.

Radio transmissions: The use of radio transmitters or similar is forbidden except with the written approval from the Employer which may be obtained subject to check if there is any interference with the Airport ATC frequencies.

Contractor's compound: The Contractor's compound shall be fenced and gated with a temporary controlled airside /landside gate (to be reinstated at the end of the Contract).

Demobilization: The Contractor shall vacate his compound within one month after substantial completion of the Works and leave the area in a clean and tidy condition to the satisfaction of the Engineer. Any remaining damage to the area or the existing pavement as a result of his workings shall be made good at his own expense.

Proceedings if damage an airfield light: If the contractor damages or displaces light fittings he shall immediately contact the Engineer. The airport maintenance personal will repair and re-mount the light fittings. The contractor is obliged to pay for each damaged light fitting. Depending on the circumstances when it happen the cost may vary.

Survey of existing cabled and conduits: Conduits and underground cables exist in the work area. Before any groundwork, the contractor shall request setting out from the Engineer.

Measures for existing cables and conduits: Existing conduits and underground cables shall be excavated manually from its location and shall be protected from damage during the work period. The contractor shall provide and install suitable safeguards for this purpose.

Any damages to cables shall immediately be announced to the Engineer and be repaired by the contractor.

Access Roads: The access to the site is via the Southern Access Road to the Airport. The Contractor shall be fully responsible for ensuring that all construction traffic, including that of subcontractors and suppliers follows only the route prescribed by the Engineer outside the Airport Boundary.

The Contractor shall provide appropriate signs, lighting and markings on the main Pristina road and at the airport entrance to direct his construction traffic. Details shall be submitted to the Engineer for his approval.

The Contractor's his subcontractors' and suppliers' traffic within the Airport boundaries shall be confined to the routes approved by the Employer.

Design: All design should be done according demands in ICAO Annex 14 volume I. Design should be presented to the Engineer 3 weeks before construction works would start in AutoCad dwg-format.

The presentation of the design should at least include plan drawing with contours with equidistance 0.1 m, 1 longitude section and 1 transverse section. Before any construction work starts should the design be approved by the Engineer

3.4 Engineers Facilities and Equipment

Ownership of the equipment and facilities provided to the Engineer: The ownership of the above, except for the total station, shall at the completion of the Works revert to the Employer. The facilities and equipment will during the execution of the Works also be used on other contracts at the discretion of the Engineer.

3.5 Setting out Project Obligations

The Contractor is responsible for checking that all basic survey points are maintained in place for the duration of the Contract and if they become missing or appear to have been disturbed the Contractor shall report the details to the Engineer and make arrangements to re-establish the points.

The Contractor shall further establish and maintain temporary bench marks and shall provide the Engineer with a schedule of their levels and coordinates.

The change, level and other markings required by the Engineer shall be scratched or clearly marked with paint on the surface of the concrete or otherwise clearly marked to the satisfaction of the Engineer.

Setting out: The Contractor shall set out the baseline for the construction and the cross sections. The foregoing intervals shall be agreed between the Contractor and the Engineer and shall be maintained so long as needed by the Engineer to check the Work.

No separate payment will be made for any work in connect with the setting out or any other Works required by him or by the Engineer to ensure the accurate location and construction of the Works.

3.5.1 Laboratory and Testing

- (a) A Laboratory approved by the Engineer will make all testing, according to the relevant specifications of Contract, and which can provide all testing specified in technical Specifications. The Contractor shall propose his means to the Engineer within 2 weeks of the signing of the Contract.
- (b) Notwithstanding the above the Contractor shall provide a mobile laboratory on site, with the equipment to be approved by the Engineer, for the daily testing. Every day the Contractor shall submit to the Engineer the results of the testing.
- (c) Before starting the work the Contractor shall submit to the Engineer the program of testing. The Contractor shall indicate which Standards will be used in every typology of works. The Engineer must approve it. In addition to the test program the Engineer can order any extra tests in a independent laboratory outside Kosovo proposed by the Engineer to an extent of up to 10 times. If the outcome of such a test is not satisfactory the test will not be included in the 10 extended tests, but paid by the Contractor.

The costs there of shall be included in the rates set forth in the Bill of Quantities and shall include the costs of taking and storing duplicate reference samples for possible future

independent testing. The Contractor shall give adequate notice of any testing at supplier's premises so that the Engineer can make necessary arrangements to witness such inspections.

Information from exploratory borings and test pits: When the Engineer directs that certain exploratory borings and tests shall be carried out on the site of the works and certain results obtained are shown on the drawings or otherwise provided, any conclusions which the Contractor may draw from such information shall be used by him as his responsibility in determining levels, classifications, and characteristics of strata for any purpose of designing foundations and structures which is stated in the contract as being his responsibility.

The Contractor will satisfy himself by his own investigations and experience as to strata and ground conditions actually occurring and must allow for such in his rates and prices and arrange his methods of working to take account of such strata and any natural or artificial variations which may occur.

Nature of the ground and condition of works: The Contractor must satisfy himself as to circumstances and conditions at the site of the Works and any construction thereon, as well as any other sites at which the Contractor may perform work, including but not limited to quarry sites, borrow areas, earthworks sites, and access available to any of the foregoing.

The Contractor shall likewise satisfy himself on conditions of the ground and the nature of the materials to be excavated, the possibility of subsidence from soft ground and bad and broken materials, and falls of rock in or arising out of the Works.

The Contractor shall further before any excavations satisfy him that there are no pipes or cables in the excavation area. All damage to existing services shall be notified immediately to the Engineer and the appropriate service authority and made good by a specialist subcontractor without delay at the Contractor's expense.

3.5.2 Quality Assurance/Quality Plan

The Contractor shall, as part of his Program, present for the approval of the Engineer a Quality Plan for the Project containing also the environmental aspects. The plan shall reflect the overall environmental and quality assurance policies of the Contractor and be guided by the standards in ISO 9000 and 14000.

Environmental Issues:

(a) All work shall be undertaken in full compliance with the Environmental Management Plan that shall be prepared and integrated with the Quality Plan for this project. The plan shall in particular consider the following environmental issues:

- Regular collection of rubbish and waste from the Contractor's and the Engineer's compounds (burning not allowed);
- Emissions from diesel engines (black smoke not allowed);
- Controlling of dust (watering, covering of loads etc) and in particular controlling that dust arising from the Contractor's operations is prevented from blowing from the site onto aircraft pavements
- Prevention of dust and soil being deposited on the main road;
- Minimizing noise from plant and equipment;
- Pollution of water (cleaning of sewage, etc.);
- Spillage of oil, fuel and hydraulic fluid.

"AS-BUILT" Drawings: The Contractor shall supply to the Engineer "As-built" Drawings and a complete testing dossier in a clear, easy- to-follow form in three copies + one digital copy for each completed section of the Works which is to be handed over for occupation or use by a specialist company or the Employer, not later than 14 days prior to its Handing Over/Taking Over.

The standard of draughtsman ship shall be at least equal to the Contract drawings and all drawings and documents shall be clearly marked "AS-BUILT" or "AS INSTALLED" as the case might be. A draft shall be initially provided for the approval of the Engineer.

The Contractor shall also provide a level survey of the completed works surfacing on a maximum 10 meters grid, all break lines in terrain must be included. Invert level and position of pipes and ducts, ground level and invert level for all connection manholes should also be provided as well as two copies of any Operations and Maintenance Manual required.

All documentation and drawings should be delivered in MS OFFICE, and AutoCad format on 1 copy of CD or DVD formatted for windows. Should the Contractor fail to submit the above-mentioned drawings and documents the Engineer may order the work done by a consultant at the expense of the Contractor.

3.5.3 Alteration to and Preservation of Services

The Contractor shall make himself acquainted with the position of all existing works such as sewers, storm water drains, cables for electricity and telephone lines, telephone and lighting poles, water mains, etc. before any excavation or other work, likely to effect the existing services, is commenced.

Where work is being carried out in the vicinity of overhead power lines, the Contractor is responsible for ensuring that all persons working in such areas are aware of the relatively distance that high voltage electricity can short to earth when cranes, on other large masses of steel, are the vicinity of power lines. The Contractor will establish for himself from the appropriate local electricity authorities the safe clearances to cables of various different voltages.

The Contractor shall be held responsible for damage to existing works or services, and shall indemnify the Employer against any claims in this respect (including consequential damages). In all cases where such works are exposed, they shall be properly shored or otherwise supported. Special care must be exercised in refilling to compact the ground under mains, cables, etc. and not to cover up exposed water meters and stop cock boxes, etc.

Poles supporting cables, adjacent to the works, shall be kept securely in place until the work is completed, and shall they be made as safe and as permanent as before.

Notwithstanding the foregoing requirements, and without lessening the Contractor's responsibility, the Contractor shall inform the Engineer immediately if any existing works are exposed.

The Contractor shall be responsible for arranging and removing services subject to the agreement of the appropriate authorities and with the approval of the Engineer, and where necessitated by the Works and shall pay for the removal of, and alteration to, services such as power lines, telephone lines, water lines, etc.

All damages to or interference with existing services, occasioned during the progress of the Works, shall be deemed to be the responsibility of the Contractor, who shall undertake to make good at his own expense any damage so caused to the existing underground services or other features, and shall be liable in respect of all claims (including claims for consequential costs) arising from such damage or interference however occasioned.

3.5.4 Work Register and Surveys Diary

The Contractor, who shall enter in it at least the following information, shall keep a Work Register on the Site:

1. the weather conditions, interruptions of work owing to inclement weather, hours of work, number and type of workmen employed on the Site, materials supplied, equipment in use, equipment not in working order, tests carried out in situ, samples dispatched, unforeseen circumstances, as well as orders given by the Engineer;
2. detailed statements of all the quantitative and qualitative elements of the work done and the supplies delivered and used, capable of being checked on the Site and relevant in calculating payments to be made to the Contractor;

The Work Register shall be arranged according to the format established by the law of the State of the Employer or to other suitable format agreed upon between the Engineer and the Contractor.

The Work Register shall be compiled in two copies and one of these shall be delivered to the Engineer on a daily basis.

The Work Register shall be, at any time during working hours, open for consultation by the Engineer or his Representative or by the Employer.

A Survey Diary shall be Performed: Unless otherwise specified, the contractual value of the work executed in accordance with the Contract shall be established and calculated by measurement. The dimensions, notes, calculations and drawings required for establishing the quantities in the course of the survey of the Works shall be entered into the Survey Diary. The Contractor continuously on the basis of the survey performed jointly with the Engineer shall keep the Survey Diary or his Representative in accordance with the various stages of completion and before any stage is covered by the next one. For the survey performed jointly with the Engineer, or when the Engineer requires a repeated survey, the Contractor shall ensure the participation of his authorized and qualified representative who shall assist the Engineer or his Representative and shall supply all the information required by either of them. Should the Contractor not be present, or should he neglect or fail to send his representative, the result of the measurement performed by the Engineer or approved by him shall be regarded as the valid survey for the Works.

The Survey Diary prepared by the Contractor shall be revised and signed by the Engineer or his representative within 14 days of its receipt. The Contractor shall participate, at the place and on the date requested by him, in the examination and approval of the Diary by the Engineer's Representative and shall agree with him the eventual corrections to be entered into the Survey Diary by the Engineer. Should the Contractor, after examining the corrections, not accept them, or should he not sign them as he accepts them, they shall be regarded as valid until a decision is taken in accordance with the General Conditions.

3.6 Access to the Working Site

The Contractor shall be in close contact with Airport Authority for the access to the working site. The works on site will be temporary suspended by the Engineer or authorized Airport's representative during landing and taking off of airplanes.

Before any action on site the Contractor has to provide a schedule of works for the approval by the Engineer or his representative. The program has to be in compliance with the airport activity and the Contractor is not entitled to any compensation for the partial admittance to the site. All the workers from the Contractor and Subcontractors must be registered and authorized by the Airport Authority before the admittance to the working site.

Faulty Work: Any work, which fails to comply with these Specifications, shall be rejected and the Contractor shall, at his own expense, make good any defects, as directed by and to the satisfaction of the Engineer.

Written Authority: "Order in Writing" shall mean any document or letter signed by the Engineer and posted or delivered to the Contractor and containing instructions, guidance or directions to the Contractor for the execution of the Contract

Whenever the word approved, directed, authorized, required, permitted, ordered, instructed, designated, considered necessary, prescribed or words (including nouns, verbs, adjectives and adverbs) of like import are used, it shall be understood that the written approval, direction, authority, requirement, permission, order, instruction, designation, prescription, etc. of the Engineer is implied unless another meaning is plainly intended.

Advertising and Boarding: No advertising material whatever will be permitted to be displayed on the site except that: The Contractor shall construct one board (dim. 2,00 x 2,50 m), carrying information supplied by and erected in the locations specified by the Pristina Airport Authority. The cost of these boards will be deemed to be included in the Contractor's rates in the Bill of Quantities. The languages shall be in Albanian and English.

3.7 Monthly Meetings

The Contractor or his authorized representative shall attend monthly meetings on the site with representatives of the Airport Authority and the Engineer. The Airport Authority dedicates a responsible person for calling, and leading the meetings.

Such meetings will be held for evaluating the progress of the contract and for discussing matters pertaining to the contract which any of the parties represented may wish to rise. Such meetings are not intended for discussing matters concerning the normal day-to-day running of the contract.

The meetings shall follow a fixed agenda:

1. Opening;
2. Approval of previous meeting;
3. Documents;
4. Technical Issues;
5. Time Schedule and Resources;
6. Hindrance and Disturbances;
7. Quality and Environmental Issues;
8. Workmen's Protection;
9. Financial Issues; Variation and Claims;
10. Establishment on Site;
11. Official Rules and Regulations;
12. Inspections;

- 13. Administrative Issues;
- 14. Other Issues;
- 15. Next Meeting.

Example:

Ref	Subject	Responsible	Discussion date
A	OPENING OF MEETING AND APPROVAL OF PREVIOUS MINUTES		
	Chairman Mr. Michael opened the meeting and welcomed the participants.	MA	24/10/2007
B	GENERAL INFORMATION AND DECISIONS		
	General Information		
	<u>Progress Report</u>		
	A progress report dated 2007-09-25 has been issued. The contents was discussed and commented under each section. In addition a graphic presentation of the progress during August was presented.	MA	24/10/2007
	Flight safety and organisation		
	There have been a few violations and mistakes by contractor on the resurfacing project, resulting in delayed air traffic. In addition to financial consequences the procedures and working hours will be changed. As discussed on last Site Meeting, the responsibility for the safety will be further clarified, meaning that the SSO functions should be taken over by the highest ranking site manager on duty, whether English speaking or not. (The existing SSOs will be assistants and translators).	AS	24/10/2007
	An internal safety audit is scheduled to take place on 28 th November.	DR	24/10/2007

	Time schedule		
	<i>A new draft Time Schedule ver 47 was presented</i>	AS	24/10/2007
F	RESURFACING, INCREASING BEARING CAPACITY ON RWY, TWY & APRON		
	General Information		
	<u>Project Management</u>		
	<i>Information that the contractor Project Manager has been replaced and the new manager appointed , who up till now has been acting.</i>	BF	24/10/2007
	<u>NOTAM</u>		
	The NOTAM procedures are now working quite well. Mr. Smith further pointed out that despite all deviations and prolonged FOD sweepings, the manoeuvring areas are today in a very much better condition compared with the situation at project start.	LA	24/10/2007
	<u>Non-conformities</u>		
	A remark regarding the construction at THR35 where an edge of up to 15 cm has been left unattended was discussed. Proper action has been taken by PIA in cooperation with both the Contractor and the Engineer. A report will be sent to ICAA for information.	DR	24/10/2007
	<u>Progress report</u>		
	<u>Distress at Cargo Apron (also called “New Apron”)</u>		
	PIA decided the existing shoulder area should no longer be used for parking and decided the shoulder should be repaired at lowest cost when the surfacing of the main apron is done	AS	24/10/2007

Table 1. Progress Report of RWY, TWY and Apron Project at PIA (Source: “Pristine International Resurfacing project)

3.7.1 Weekly Progress Meetings

During the execution of the Contract the Contractor or his authorized representative shall have regular progress meetings with the Engineer, who is responsible for calling and leading the meetings. These meetings shall focus on the on-going activities, which shall be documented by the Contractor and include relevant photos from the site with comments. The number of photos shall normally be between 7 and 10. The Employer may also choose to attend these meetings.

3.8 Demolition and Site Clearance

Before start of operations the Contractor shall submit for the approval of the Engineer the work plan including the procedures to be followed for submittal, approval and activity start. No activity may be started and in particular no pavement layer constructed until the explicit approval of the Engineer to proceed has been obtained.

General Clearance: At the commencement of the Contract, unless otherwise specified or directed, consists of cutting, removing and disposing of all hedges and trees, stones, vegetation and all objectionable organic material from the area of the road, RWY, TWY, junctions, material sites, lines of ditches or drains and such areas as the Engineer may direct. The areas between the actual site of the road and the toes of embankments outside the ditches shall be cleared completely of all grass and vegetation irrespective of depth. Where organic topsoil occurs this shall be removed and stockpiled separately for re-use or spoiled, as directed by the Engineer.

The holes left by the removal of roots shall be back-filled and compacted to 93% BS Compaction (heavy) with approved material up to the existing ground level or up to the top of sub grade level if the area is to be excavated, whichever is the lesser.

Clearing shall further include the removal of loose stones and boulders, which are exposed, or laying on the surface.

Cleaning of Routs and Trees: Parts of the area for extension of the civil apron need to be cleaned from small trees, bushes and routs. Trees, bushes and routs shall be transported to by the Contractor arranged and paid dump area.

Removal of Structures and Fence: The Contractor shall carefully take down and clear only such buildings, fences or other structures directed by the Engineer. The components shall be dismantled, cleaned and stacked in separate heaps. Materials that in the opinion of the Engineer are not fit for re-use shall be removed from the site to a tip provided by the Contractor. Materials that are re-usable shall remain the property of the Employer and shall be preserved and protected by the Contractor until removed by the Employer or until the expiration of the Contract.

The Contractor shall, at his own expense, make good any damage done to other property during the removal of these buildings fences and other structures and, if necessary, pay compensation.

Preservation of Property and Facilities: All existing airport pole lines, signs, cables, pipes, sewage, and all airport facilities, paths, fences, walls, hedges, trees, shrubs, lawns and other features within or adjacent to the site shall be protected from damages, unless instructed by the Engineer to be removed or otherwise dealt. The Contractor shall at his own expense provide and install suitable safeguards to be approved by the Engineer for this purpose.

Any damages to property or facilities shall be made good at the Contractor's expense and to the satisfaction of the Engineer.

4.0 PROJECT DESCRIPTION ¹⁴

4.1 Earthworks

Materials and definitions: This Section deals with earthworks materials and the getting, and disposing of the same. When earthworks will take place on Airside of the airport should safety regulation be follow. This means for example that when a work shift is ending should transition slopes have been built up. For markings, transition slopes etc.

4.2 Excavation of Foundations and Bases

This section covers requirements for excavating bases, and foundations for bridges, culverts, walling and other structures.

General: Prior to commencement of any excavation, the Contractor shall notify the Engineer in good time to ensure that measurements, cross sections and levels can be established.

Watercourses: The Contractor shall be responsible for the removal of the drain cleanings (tailings) as specified in writing by the Engineer.

Clearance of existing watercourses shall include the removal of vegetation, vegetable matter and all other deposits within the watercourse profile. Materials resulting from this clearance except tailings shall be dealt with as unacceptable material.

New watercourses and cleared existing watercourses shall be maintained in a clear condition. The excavations shall be to the following dimensions, downstream of culverts a bottom width of 3m and with a general sloop of 1:2 of all banks.

All excavation has to be carried out in a safe and an orderly manner without causing risk for drains and excavation of caving in. Where the surface is to remain exposed it shall be top soiled and seeded.

Removal of topsoil: The removal of topsoil where directed, shall be at an average depth of 100 mm over the area and it shall be deposited and spread neatly and smoothly in thin layers within the road reserve clear of the works, or stockpiled for re-use. Hauling of surplus material is included in the rate.

Material other than Topsoil, Rock or Artificial Hard Materials: Where suitable stable material is encountered during excavation against which the casting of concrete is permissible, that part of the trench or foundation pit shall be excavated neat to the dimensions of the base unless directed otherwise by the Engineer. Over excavation (over break) in such suitable stable material shall be backfilled with the same Class of concrete as that in the base, or with mass concrete fill as specified or directed by the Engineer. Where in the opinion of the Engineer the casting of concrete against the excavated earth faces is not permissible.

Boulders, logs or any other unsuitable material excavated shall be spoiled.

When material suitable for founding is encountered near the founding level, excavation to final grade shall not be made until just before blinding layer is placed.

Where in the opinion of the Engineer unsuitable material is encountered at founding level such material shall be removed and replaced with approved compacted granular fill.

No Aggregate or other fill materials shall be placed before the excavation has been cleaned, inspected and approved by the Engineer.

Utilization of Excavated Material: Suitable excavated material and material recovered from temporary work shall be utilized for backfill. Any surplus material shall be disposed of and any shortfall made up with suitable fill.

Backfilling around Structures: The materials shall be placed simultaneously on both sides of an abutment, wall, or pier. Backfilling shall be carried out with an approved material in horizontal layers.

Turfing: To increase bearing capacity on the strip nearest the runway should leveled strip After turfing area should be cleaned of stones over 50 mm, old cables etc. that could be FOD on air traffic maneuver area.

4.3 Measurements and Payment for Earthworks

The basis of measurement is the cubic meter (m³) as theoretically measured on drawings. The work includes all necessary operations required to achieve the finished product in accordance with these specifications before applying the next layer as well as all related necessary work described here. Payment for all the above work required shall be included in the rates inserted in the Bill of Quantities.

4.4 Road and Paving's

When works will take place on Airside of the airport should safety regulation be followed. This means for example that when a work shift is ending should transition slopes have been built up. Along the boundary line between maneuver area for aircrafts and work area should flight cone with red obstacle lights be placed with c/c 5 m. Payment for transition slopes, cones will be included in the rate for each item.

4.4.1 Asphalt Concrete Quality Control

To fulfill the requirements of the Quality assurance, the Contractor shall conduct the testing on the asphalt concrete mix, aggregates and pavement. The testing may be regarded as a minimum and the Contractor shall be free to establish his own approved control program with additional testing included.

If abnormal or irregular test results appear indicating a non-conformation with the specifications, the Employer shall be notified at once. Appropriate remedial measures shall be taken at once and additional testing may be required.

The Employer shall have free access to carry out supplementary instrumental in-situ measurements for comparison. Such tests shall not interfere with the progress of the general asphalt concrete work, and the Contractor will on request be informed about test results.

Asphalt concrete not fulfilling the requirements of the Contract Documents shall be removed at no extra cost to the Owner. This applies to all requirements, such as surface, placing, mixing and material specifications.

Before start of works, the Contractor must have submitted a quality system according to ISO 9000, adjusted for the actual project to the Employer for approval. Especially important parts of the quality system may be preparation of works with quality critical moments, hazard analysis with belonging action plan (for example machine breakdown, unexpected precipitation etc.), a schedule for how to leave the working area before air traffic gets on and reporting of deviations.



Picture 1. Distressed Asphalt (Source: Pictures taken from the construction site)

In Implementation part there were problems with Control testing of asphalt and aggregate, Even though it is well defined in chapter 3 of the project. The problems and difficulties were occurred during the execution of the work. In Kosova there are lot of laboratory for asphalt and concrete but unfortunately they do not fulfill international standards. Taken this into considerations the Contractor was obliged to use European laboratories. Considering the evaluation results it resulted impossible presently to find any local laboratory capable of anything but limited testing. Also during the project implementation the asphalt work were performed only at night when there was not traffic, The temperature difference between day and night is often greater the winter-to-summer temperature contrast in these latitudes that was affected asphalt and concrete quality.

4.5 Proposed Work Methods to Achieve Required Quality

A detailed Work Plan and a strict Time Schedule are essential parts to achieve and check on progress and specified quality. Some important extracts from the Contract Documents are provided below:

Surface course

Paving of the surface layer for runways and taxiways shall commence at the runway/taxiway edge and proceed in longitudinal strips towards the runway centreline. On aprons, paving shall be started at the bottom of the slope. A “roof tile” construction of the longitudinal joints shall be constructed.

The laying of the surface course on a runway or a taxiway shall be executed in a way that the approximately half of the length of the runway/taxiway or by the Engineer approved phase length with minimum 4 m width could be completed during one shift without transversal joints.

Surface course joints

On the runway surface course the number of transverse joints shall be kept to an absolute minimum and joints shall not be made unless required by sudden unforeseen conditions such that the quality of the work may be imperilled. Due to the time of the available working shifts for paving, maximum one transverse joint could be allowed to execute the paving of each longitudinal section of the runway and taxiways.

Where transverse joints not can be avoided, the edge of the previously laid course shall be milled (5-6 m may be required) to expose an even vertical surface through the full thickness of the layer. Hot bitumen (160/220) shall be applied to the vertical joints before paving is continued.

All joints shall be treated with greatest care. They shall be protected against any impurities and soiling. Where soiling occurs, it shall be removed and the surface thoroughly cleaned. The milled area shall be cleaned and hot asphalt (160/220) shall be applied to all longitudinal and transverse joints before the adjoining strip is placed.

The longitudinal joints shall have a maximum height of 50 mm to allow air traffic. The vertical edge shall be compacted with edge compactor, maximum slope of 45 degrees. The stones in the joints must be locked with bitumen 160/220, to avoid stones to come loose.

Comments, conditions for the air traffic, longitudinal joints

Between the working shifts, when the airport is open for air traffic the above working method will give longitudinal joint on the RWY. The maximum level difference between last levelling coarse / new surface layer will be 50 mm. The total length of the longitudinal joint will be from half the RWY length up to the whole RWY length.

The paving of the surface layer on the RWY is planned to be finished in April – May within 15 - 20 shifts.

This method of working has been used at most airport rehabilitations in both Sweden and Iceland. It has provided good quality, an even surface and a long life for the asphalt joints without jeopardizing the flight safety.

A safety assessment, on this issue will be facilitated by PIA Quality and Safety Office, with contractor and PIA engineers, before execution of the works. The findings of the safety assessments will be in the safety procedures.

Reporting of Runway/Taxiway Condition

After completing the work shift the work area shall be inspected by the Airport Safety Officer (ASO) together with the Site Safety Officer (SSO) from the Contractor. The ASO reports to the ATS, details on the location of the work joint as well as the existing drop. The ATS then send a NOTAM regarding the deviation. A new NOTAM must be sent for each change.

4.5.1 Risk Assessment Report¹⁵

Risk Assessment has been conducted of the working method for paving the RWY surface course. The aim of risk assessment is risk analysis that involves the identification of undesired events, and the causes and consequences of these events.

In the last two years there lot of works on rehabilitation and reconstruction of the RWY have been done and now the works are in its final face. The thick asphalt leveling courses to make up for many years lack of maintenance and correct deviations from the standard described in ICAO Annex 14 are completed.

The goals to arrive at optimum run off conditions within the limits of Annex 14 and in addition to increase the carrying capacity of the main pavements will be fulfilled when the final surface layer is completed The approach that was taken was to try and identify the most

¹⁵ *INTEGRA Risk Assessment training material*

suitable means for mitigation of unacceptable risks having in mind a system approach (people, procedures, equipment).

Scope of FHA and PSSA for this project

The scope of this evaluation was working method for paving the RWY surface course. While conducting this assessment, safety assessments session's participants were focused mainly on safety aspects without dealing further with quality of services and security aspect.

System Description

According to the contract it is foreseen that paving of the surface layer for runway shall commence at the runway edge and proceed in longitudinal strips towards the runway centerline. A "roof tile" construction of the longitudinal joints shall be constructed.

The laying of the surface course on a runway shall be executed in a way that the approximately half of the length of the runway or by the Engineer approved phase length with minimum 4m with could be completed during one shift without transversal joints.

RCS was adopted for this project

Consequence	4	Catastrophic	Review	Unacceptable	Unacceptable	Unacceptable	Unacceptable
	3	Hazardous	Review	Review	Unacceptable	Unacceptable	Unacceptable
	2	Major	Acceptable	Review	Review	Review	Review
	1	Minor	Acceptable	Acceptable	Acceptable	Acceptable	Review
			Extremely Improbable	Extremely Remote	Remote	Reasonably Probable	Frequent
		A	B	C	D	E	
Probability							

Table 2. Risk Classification Scheme

Catastrophic	Loss of aircraft Multiple fatalities
Hazardous	Large reduction in safety margins Serious or fatal injury to a small number of people
Major	Significant reduction in safety margin
Minor	Nuisance Operating limitations or emergency procedures

Table 3. Hazard Consequences

Airport ops: approximately 30ops per day		
Frequent:	1/100 (every 3 rd day)	10 ⁻² movement
Reasonably Probable:	1/1000 (10 times during a year)	10 ⁻³ movement
Remote:	1/10000 (once a year)	10 ⁻⁴ movement
Extremely Remote:	1/50000 (once in 5 years)	2x10 ⁻⁵ movement
Extremely Improbable:	1/100000 (once in ten years)	10 ⁻⁵ movement

Table 4. Risk Severity Airport Operations that were taken into account

The table below represents the findings regarding the Hazard ID and the associated effects. The effects deemed to be unacceptable or tolerable for particular hazards are further mentioned in the PSSA phase where appropriate mitigation is recommended.

#	Hazard	Hazard Effects	Environmental Conditions	S ¹	L ¹	T ¹	Rationale Remarks
1	Longitudinal edge 45 degree	• Structural damage to a/c	•	3	B	R	Small a/c
		• a/c instruments damages		2	A	A	
2	Improper transverse ramp	• Structural damage to a/c	•	3	B	R	Slope of ramp 0, 5 % in more than 5cm thickness. 1% in less than 5cm thickness.
		• Creation of FOD's		2	D	R	
3	Standing water	• Aqua planning	•	2	B	R	
		• Partial flooding		3	B	R	
4	Lack of marking	• Confusion of pilot	•	2	B	R	
5	Time schedule	• Delays of RWY opening	• Precipitations	2	A	A	Not approved
		• Cleaning of FOD's (blowing the fresh layer of asphalt)		3	B	R	Cooling (asphalt)

Table 5. Hazard Identification (FHA) - Severity Classification of Hazard effects

#	Hazard	Hazard Effects	Causes	Risk Mitigation	S ¹	L ¹	T ¹	Rationale Remarks
1	Improper longitudinal edge 45 degree	• Structural damage to a/c	• Low compaction of new asphalt layer	Apply compaction of asphalt edges (especially edges 45 degree)	2	A	A	
		• a/c instruments damages			2	A	A	
2	Improper transverse	• Structural damage to a/c	• Inappropriate ramp slope • Low	-Length of ramp to be crosschecked	2	A	A	

#	Hazard	Hazard Effects	Causes	Risk Mitigation	S ¹	L ¹	T ¹	Rationale Remarks
	ramp	<ul style="list-style-type: none"> Creation of FOD-s 	<ul style="list-style-type: none"> compaction of ramp asphalt layer Indentation of asphalt lanes 	against the height of asphalt layer. -Compaction to be done prior/during airport opening hours. -Length of the lanes to be the same, no indentation.	2	A	A	
3	Standing water	<ul style="list-style-type: none"> Aqua planning 	<ul style="list-style-type: none"> Heavy rain 	Airfield Maintenance personnel to perform frequent inspection(s), and as needed to use the suction truck pumps to remove the standing water.	2	A	A	
		<ul style="list-style-type: none"> Partial flooding 			2	A	A	
4	Lack of marking	<ul style="list-style-type: none"> Confusion to pilot 	<ul style="list-style-type: none"> Precipitations Short time-frame to perform the painting 	In case of inability to paint, CATCO shall be informed to send the information via NOTAM/ATIS broadcast as appropriate.	2	A	A	
5	Time schedule	<ul style="list-style-type: none"> Delays of RWY opening 	<ul style="list-style-type: none"> Late execution of ramp. 	Follow the approved work-schedule, any changes to it to be priory accepted by PIA.	2	A	A	
		<ul style="list-style-type: none"> Cleaning of FOD's (blowing the fresh layer of asphalt) 			2	A	A	

Table 6. Risk Assessment (PSSA) and mitigation

From the corresponding tables of FHA and PSSA one can easily observe that there were few hazards that represented issues to focus on during the PSSA phase. Nevertheless, at the end of the PSSA phase and the mitigation proposed in it (most of it procedures already in place or in the process of implementation) all risks resulted in acceptable (tolerable).

Duties and responsibilities delegated from this assessment are defined in above Risk Mitigation Colum.

4.6 SAFETY REGULATIONS CONSTRUCTION WORKS WITHIN THE AIRPORT AREA¹⁶

4.6.1 Liaison Machinery

Before the commencement of any substantial work on the movement area, liaison machinery comprising representatives from the Airport Operations Department, Air Traffic Control, Airport Maintenance Department and contractors' agents should be established.

Responsibility conditions have to be stipulated between all involved actors and contractors working within the airport area. The group should meet as often as considered necessary to review progress and consider the need for any change in working practices to meet operational requirements. Airline companies should be invited to attend at the planning meetings regarding construction work contra air traffic.

4.6.2 Isolation of Work Area

As far as is practicable working areas should be blocked off from the active parts of the movement area by the erection of physical barriers. This is to both warn pilots and preclude work vehicles inadvertently straying onto the movement area. Any barriers must be marked for day use and adequately lit by night. The lights of taxiways leading into working areas must be permanently "off".

4.6.3 General Working Rules

The Contractor shall comply with the Airport Regulations, Instructions and all other regulations whatsoever which affect the execution of the Works. The Contractor shall ensure that all the employees and subcontractors are made aware of these regulations. The air traffic

¹⁶ ICAO ANNEX 14, Chapter 4, 5, 8, 9

shall be able to proceed without hindrance, any disruptions are not allowed without approval by the Airport Management.

If the Contractor opens up any entrance gates at his purpose, the Contractor has to look after that no admittance to the secure object is made.

The Contractor is obliged to take and pay for necessary measures and liable for damages on real property, vehicles or similar both inside and outside the airport area caused by him. The Contractor is also responsible for all damage on cables caused by him throughout the execution of the works.

Obstacle markings required for the execution of the works are paid and take measured for by the Contractor.

Before work commences agreement should be established on:

- a) The hours of work, execute works to such an extent as possible within periods when not as much air traffic is going on;
- b) The authorized routes – preferably these should be marked with contractors signs. At critical points controls should be established. Where there is real risk of conflict between aircraft and vehicles, control points should be manned. At less critical point controls may be affected by lights or warning signs.
Methods of surveillance of the work vehicle movements and placement equipped with or without communication facilities.
In case of bad weather with bad visibility the airport applies particular procedures to minimize the risk of collisions between aircraft and vehicles – LVP, Low Visibility Procedure-, which may cause limitations for the admittance to the Movement area;
- c) The communications facilities to be used. Where direct control of vehicles is required each vehicle should either have R/T or be escorted by a suitably equipped vehicle. In some circumstances it may be sufficient to have direct communications with control points by R/T or by direct telephone lines to air traffic control.

- d) The permitted heights of vehicles and equipment and the limitations to be placed on operating heights of crane jibs or other mobile obstacles that occurs during the works along the sides of the runway or at the runway end. That also includes the laying up of mounds and the placement of supply depots of construction material and equipment.
- e) Any limitation to be placed on use of electrical equipment which might cause interference with navigational facilities or aircraft communications.
- f) Any blasting works shall only be executed on period of time agreed upon between the Contractor and the Airport Management. The Contractor must pay attention to that the aircrafts as well as several vehicles are equipped with transmitting equipment and that stationary transmitting objects are in operation within the airport area.

4.6.4 Safety

Contractors should be warned in writing of possible hazards to personnel working on airports, in particular the jet blast problem and noise.

For works on the Manoeuvring area of the aircraft and on aprons, aircraft stands etc. required safety distance to the aircraft jet blast must be take into consideration. Jet blast is the exhaust blow from the engines of an aircraft. This blow can be very strong depending on type of the engines and speed. For example, when executing works behind a displaced threshold, a safety distance is required from an aircraft for take-off, when the wind velocity of the exhaust blow could rise to very large amount of value.

Where necessary, contractors should be briefed to provide lookout men. A distinctive jacket must be worn at all times. This can be of the waistcoat variety colored day-glow red, reflective orange, or reflective yellow.

There is total prohibition for bringing animals to the airside.

Temporary hazards: The term “temporary hazard” includes work in progress at the sides or ends of a runway in connection with airport construction or maintenance. It also includes the plant, machinery and material arising from such work and aircraft, immobilized near runways. The prime responsibility for determining the degree of hazard and the extent of tolerable obstacle must ultimately rest with the competent authority who should take into account:

- a) Available runway width and length;
- b) Types of aircraft operating at the airport and distribution of traffic;
- c) Whether or not alternative runways are available;
- d) The possibility of cross-winds operations, bearing in mind seasonal wind variations;
- e) The weather conditions likely to prevail at the time, such as the visibility and precipitation. The latter is significant as it adversely affects the braking coefficient of the runway, and thus an aircraft’s controllability during ground run;
- f) The possibility of a compromise between a reduction in runway length and some degree of the approach surface infringement;

All such hazards should be promulgated by NOTAM and marked and lighted in accordance with the requirements of Annex 14. Restrictions for precision approach runways category I and II

No works should be permitted within the obstacle free zone when the runway is in use. All equipment and personnel should be outside the obstacle-free zone.

Three zones alongside runways can be identified zones: I, II and III.

4.6.5 Works on Taxiways, Apron and Aircraft Stands, Temporary Obstacles

Temporary obstacles on taxiways, apron and aircraft stands refer to any obstacles that come up from work in progress inside these areas. That also includes the laying up of mounds and the placement of supply depots of construction material and equipment.

Temporary obstacles close to taxiways, aprons and aircraft stands must not be of such height or extent that any risks arise for taxiing aircraft.

The height of any temporary obstacles within 15 m from the taxiway edge (code letter A 10 m) should not exceed 0.6 m and must not exceed 1 m. Pits and other cavities should be refilled and compressed as soon as possible.

Remark. It could be necessary to exceed the distance to such obstacles for taxiways that serve very large aircraft.

Any restrictions for the use of any taxiway, apron or aircraft stand must continuously be reported to the air traffic control.

Paving works on runways, taxiways and aprons: When execution of the levelling course on a runway opens for air traffic between the working shifts, the minimum width of the laying must be 22.5 m each side from the centre line and without longitudinal joints with level differences.

The surface course should be executed from the runway/taxiway edges towards the middle of the runway/taxiway to receive a “roof tile” construction of the longitudinal joints. The surface course on an apron should be executed in a similar way.

The laying of the surface course on a runway or a taxiway should be executed in a way that the whole runway/taxiway length or stated phase length with minimum 4 m width could be completed during one shift without transversal joints.

All paved sections on a runway open for air traffic between the working shifts, must be spliced with a maximum slope of 1 % with a layer thickness less than 50 mm and with a maximum slope of 0.5 % with a layer thickness more than 50 mm. Splices must be executed on a taxiway with a maximum slope of 1.0% with a layer thickness more than 50 mm. If layer thickness less than 50 mm no splices have to be executed.

It is not allowed to execute transverse splices with pads of paper or plastic material on areas operated by air traffic due to the risk that jet blast blows up the splices. The splices must be milled off and a straight joint must be executed when the paving works are to be resumed.

The longitudinal joints should have a maximum height of 50 mm to allow air traffic. The stones in the joints must be locked with bitumen 160/220, to avoid stones to come loose.

When layer thickness more than 50 mm, a longitudinal splice has to be executed with a

maximum slope of 10 % compared to the underlying layer. Before adjacent pavement strip has to be executed the total thickness of the splices have to be milled off.

Paved area cleanliness: Where contractor's work on or traverse aircraft pavement areas, these areas should be thoroughly inspected before they are opened again for aircraft use, with particular attention to the presence of debris and the general cleanliness of the surface. Where aircraft are constantly using areas open to contractors, inspection should be carried out at frequent intervals to ensure that the contractor has carried out any necessary cleaning.

Any contaminations or waste must be removed immediately. After the finished working shift the runway must be cleaned and cleared for air traffic. Any vehicles or other equipment must be moved out of the area and be parked on an assigned place. Before the Contractor leaves the maneuvering areas over to the Airport Management after a finished working shift, the areas have to be approved by the Airport Management. If the inspected area does not fulfil the requirements and is properly cleaned, the Airport Management could clean the areas at the Contractors expense.

FOD-Foreign Object Damage- foreign objects that can cause damage to any aircraft should not occur on the movement area and has to be removed immediately. The Contractor must make internal inspections of FOD regularly during the working shift as when the area will be left. The waste and packaging material should be put into a covered container.

The working area must be prepared after completed works.

Marking and lighting: Visual aids for denoting restricted use areas. All obstacles marking and lighting should be firmly established, to prevent that jet blast from aircrafts makes them to blow away or be blown into the aircraft engines etc. The Contractor should regularly check the placement of the markings and lightings.

Closed runways and taxiways, or parts thereof :A closed marking should be displayed on a temporarily closed runway or taxiway or portion thereof, except that such marking may be omitted when the closing is of short duration and adequate warning by air traffic services is provided.

Location

On a runway a closed marking shall be placed at each end of the runway, or portion thereof, declared closed and additional markings shall be so placed that the maximum interval between markings not exceed 300 m. On a taxiway a closed marking shall be placed at least at each at each end of the taxiway or portion thereof closed.

Characteristics

The closed marking shall be of the form and proportions as detailed in Figure 2.6, Illustration a), when displayed on a runway, and shall be of the form and proportions as detailed in Figure 2.6, Illustration b), when displayed on a taxiway. The marking shall be white when displayed on a runway and shall be yellow when displayed on a taxiway.

When an area is temporarily closed, frangible barriers or markings utilizing materials other than paint or other suitable means be used to identify the closed area

Lighting on a closed runway or taxiway or portion thereof shall not be operated, except as required for maintenance purposes.

In addition to closed markings, when the runway or taxiway or portion thereof closed is intercepted by a usable runway or taxiway that is used at night, unserviceability lights shall be placed across the entrance to the closed area at intervals not exceeding 3 m.

4.7 Marking of Temporary Obstacles

Marking of temporary obstacles has to be executed when construction/maintenance works proceed. Vehicles, machines and equipment proceeding in the airports movement area are considered as obstacles and have to be marked.

Adequate marking arrangements should be insisted on for crane jibs when extra conspicuity is considered desirable. If work is of prolonged duration a constant watch should be maintained to ensure that marking and lighting of obstacles and unserviceable areas does not degrade below acceptable limits. This is particularly important with marking and lighting arrangements to indicate a displaced threshold.

Flags used to mark objects shall be displayed around, on top of, or around the highest edge of, the object. When flags are used to mark extensive objects or groups of closely spaced objects,

they shall be displayed at least every 15 m. Flags shall not increase, the hazard presented by the object they mark.

Vehicles, machines and equipment temporary used in the airport movement area must be provided with a vehicle flag or hazard lights.

Flags used to mark fixed objects shall not be less than 0.6 m square and flags used to mark mobile objects, not less than 0.9 m square.

Flags used to mark fixed objects should be orange in colour or a combination of two triangular sections, one orange and the other white, or one red and the other white, except that where such colours merge with the background, other conspicuous colours should be used.

Flags used to mark mobile objects shall consist of a chequered pattern, each square having sides of not less than 0.3 m. The colours of the pattern shall contrast each with the other and with the background against which they will be seen. Orange and white or alternatively red and white shall be used, except where such colours merge with the background.

The hazards lights on work vehicles or other mobile equipment shall be twinkling orange or twinkling yellow light without blinding.

Temporary obstacles that penetrate the obstacle limitation surface beyond the airport movement area and runway strips must be marked as a permanent obstacle and have obstacle lights.

4.8 Effects on Operations Limits

The effect of tall cranes on ILS and radar will need to be considered in conjunction with those responsible for electronic landing aids and steps taken to reduce limitations to the minimum. Construction equipment may have adverse effects on obstacle clearance limits and dominant obstacle allowances and these should be considered and the appropriate authorities consulted when working arrangements are being planned.

Vehicles or other equipment may not proceed through or be placed inside the restricted area of the ILS- instrument landing system or the radar equipment without clearance from the air traffic control. Works to be executed within the restricted area shall be reported to the air traffic control in advance.

There are restricted areas around the ILS heading- and glide slope marker according to the Airport Authorities.

Restricted area number 1 consists of the area where vehicles, mounds or other material could affect the signal in a way that:

- a) The marker turns off
- b) Uncontrollable disruptions occur

Restricted area number 2 consists of the area within which occasional persons may cause the marker to turn off.

Remark: Even outside the restricted areas 1 and 2 can vehicles or terrain changes cause disruptions, depend on the size and the type of the object. Sensitive area for the heading marker is the whole runway and for the glide slope marker the prepared ground surface for the glide slopes.

4.9 Rescue and Fire Fighting

Smoking is not permitted on aprons, inside hangar- except for office rooms and other rooms that allow smoking- and for closer distance than 20 m from an aircraft, tank lorries, refueling facilities, hangar or any entrance to a hangar.

Notice that smoking is neither permitted inside a vehicle in the described areas.

Vehicles, heater units, ground power units and other similar units worked by an internal combustion engine and proposed for use inside a hangar or less distance than 20 m from refueling vehicles and facilities, should be equipped with a spark- and flame arrester approved by the authorities for blasting explosives.

The refueling vehicles must always when refueling an aircraft have open ways out to be able to evacuate immediately in case of emergency.

Keep away from emergency roads and exits in case of emergency. Give always way to the emergency vehicles.

4.10 Movement Area

To get admittance to the Movement area requires a particular permission from the Airport Management or the airport staff in charge. If there is an open instrument aerodrome, there is also need for permission from the airports air traffic control or person who has got authorized by the air traffic control to permit.

The authorities responsible for the operation of vehicles on the movement area should ensure that the operators are properly qualified. A special driving permission for everyone that drives a vehicle on airside is required and is issued by the airport after special training and examination tests.

This may include, as appropriate to the drivers function, knowledge of:

- a) The geography of the aerodrome;
- b) Aerodrome signs, markings and lights;
- c) Radiotelephone operating procedures;
- d) Terms and phrases used in aerodrome control including the ICAO spelling alphabet;
- e) rules of air traffic services as they relate to ground operations, the vehicles always have to give way to the air traffic, Speed limits on aprons are 30 km/h, 15 km/h within 15 m of any aircraft;
- f) Airport rules and procedures; and
- g) Specialist functions as required, for example, in rescue and fire fighting.

The operator should be able to demonstrate competency, as appropriate, in:

- a) the operation or use of vehicle transmit/receive equipment;
- b) Understanding and complying with air traffic control and local procedures;
- c) Vehicle navigation on the aerodrome; and
- d) Special skills required for the particular function

Vehicles may proceed inside the maneuvering area only after directions by the air traffic control or when it is missing, by the responsible airport staff and with the appropriate designated authority before entering the apron.

In addition, as required for any specialist function, the operator should be the holder of an authorized drivers license, an approved radio operator's license or other licenses.

The above should be applied as is appropriate to the function to be performed by the operator and it is not necessary that all the operators be trained in the same level, for example, operators whose functions are restricted to the apron.

Special vehicles, which require special training to handle it, could only be driven by anyone who has got a certificate of competency for the special vehicle type inside the airport area.

Anyone being in the Movement area must pay attention to and give way to the air traffic and obey to the messages and the signals, given from the air traffic control.

A vehicle with radio equipment shall keep maintain communication with the air traffic control when it is open. Vehicles equipped with twinkling warning lights must be turned when passing these areas.

If someone disrupts the order, acting drunk or with its behaviour becomes a risk to the air traffic safety, the officer of the airport safety department is entitled to refuse entry to the airport area. Also the engineer is allowed to send away anyone according to that, even suspend the person for good.

Drugs or alcohol is total forbidden to use or bring inside the manoeuvring areas.

During the air traffic, the vehicles must stop on a distance from the runway centre line according to:

Minimum distance from the runway centre line to a holding bay, runway-holding position or road-holding position

- a) If a holding bay, runway-holding position or road-holding position is at lower elevation compared to the threshold, the distance may be decreased 5 m for every metre the bay or holding position is lower than the threshold, contingent upon not infringing the inner transitional surface.
- b) This distance may need to be increased to avoid interference with radio navigation aids, particularly the glide path and localizer facilities. Information on critical and sensitive areas of ILS and MLS is contained in Annex 10, Volume I, Attachment C and G, respectively.
- c) Where the code letter is F, this distance should be 107.5 m.

During the air traffic, the vehicles must stop on a distance from the taxiway centre line according to:

Code letter A 16.25 m

B 21.5 m

C 26 m

D 40.5 m

E 47.5 m

F 57.5 m

Minimum distance between an object/vehicle and an aircraft stand taxi lane centre line (on apron) according to:

Code letter A 12 m

B 16.5 m

C 24.5 m

D 36 m

E 42.5 m

F 50.5 m

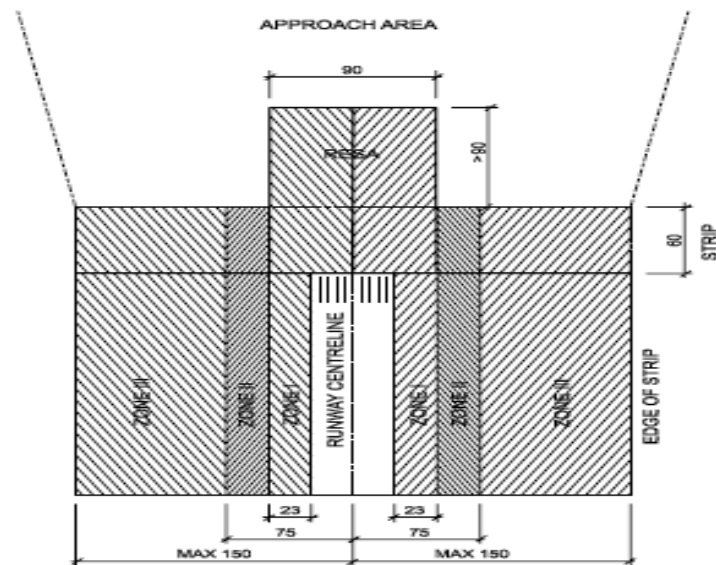


Figure 5. Limits zones (Source: Prishtina International Safety Regulation)

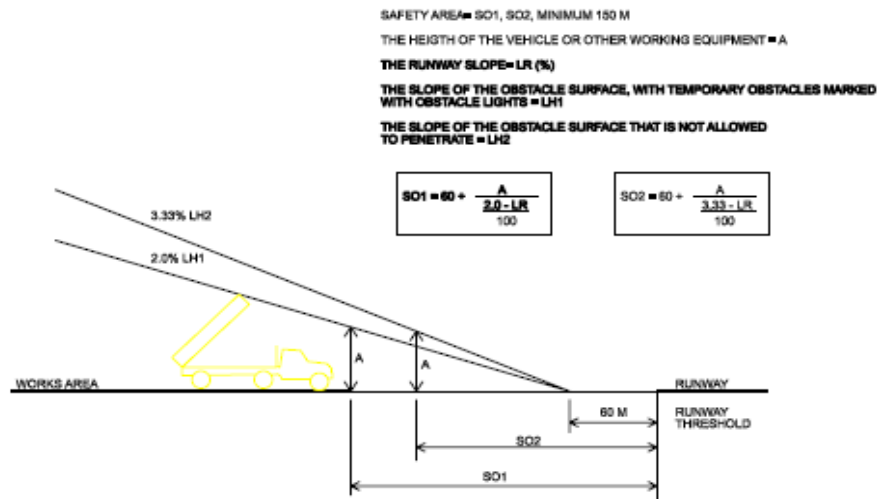


Figure 6 .Principle sketch over the size of the safety area(Source: Prishtina International Safety Regulation)

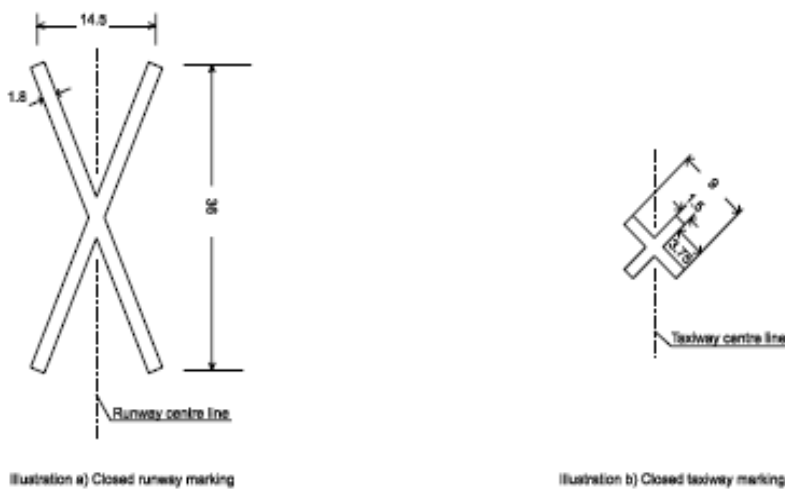


Figure 7. Closed Runway and Taxiway Markings(Source: Prishtina International Safety Regulation)

4.11 TIME SCHEDULING

Work Time Schedule														
ID	Task Name	Duration	Start	Finish	S	O	N	D	J	F	M	A	M	J
	RESURFACING Signing Contract	0 dys	Mon 05-10-03	Mon 05-10-03	-									
2	Mobilization	25 dys	Mon 05-10-03	Fri 05-11-04		█	█							
3	Detailed Survey	35 dys	Mon 05-10-17	Fri 05-12-02		█	█	█						
4	Temporary Air Safety Works	492 dys	Mon 05-10-17	Mon 07-09-03		█	█	█	█	█	█	█	█	
5	Pipe-, duct- and culvert works	181 dys	Mon 05-10-17	Mon 06-07-17		█	█	█	█	█	█	█	█	
6	Earth Works, Roads and Paving's	214 dys	Mon 05-10-17	Thu 06-08-31		█	█	█	█	█	█	█	█	
7	TWYs Milling and asphalt paving	337 dys	Mon 06-04-17	Tue 07-07-31								█	█	█
8	Milling, Repair, Levelling, Widening	135 dys	Mon 06-04-17	Fri 06-10-20								█	█	█
9	Surface course 2006	90 dys	Mon 06-05-29	Fri 06-09-29								█	█	█
10	Surface Course 2007	67 dys?	Mon 07-04-30	Tue 07-07-31								█	█	
11	RWY Milling and asphalt paving	282 dys	Mon 06-07-03	Tue 07-07-31										█
12	Milling, Repair, Levelling, Widening	80 dys	Mon 06-07-03	Fri 06-10-20										█
13	Surface course	45 dys	Wed 07-05-30	Tue 07-07-31									█	█
14	Aprons Milling and Asphalt Paving	337 dys?	Mon 06-04-17	Tue 07-07-31										█
15	Shallow Bases	247 dys	Mon 06-08-21	Tue 07-07-31										█
16	TWY Shallow Bases 2006	30 dys	Mon 06-08-21	Fri 06-09-29										█
17	TWY Shallow Bases 2007	60 dys	Wed 07-05-09	Tue 07-07-31										█
18	RWY Shallow Bases	30 dys	Wed 07-06-20	Tue 07-07-31										█
19	Final Documentation and As Built Drawings	90 dys	Mon 07-04-30	Fri 07-08-31									█	█
20	Hand Over	0 dys	Mon 07-09-03	Mon 07-09-03										
21	APRON EXTENTION Signing Contract	0 dys	Mon 05-10-03	Mon 05-10-03										
22	Mobilization	25 dys	Mon 05-10-03	Fri 05-11-04		█	█							
23	Survey and Design	15 dys	Mon 05-10-17	Fri 05-11-04		█	█							
24	Pipe, Duct, Earth, Paving works	170 dys	Mon 05-11-07	Fri 06-06-30		█	█	█	█	█	█	█	█	
25	Area outside 15 m existing Apron edge	170 dys	Mon 05-11-07	Fri 06-06-30		█	█	█	█	█	█	█	█	
26	Area 0-15 m existing Apron edge	65 dys	Mon 06-04-03	Fri 06-06-30									█	█
27	Asphalt Milling and Paving	55 dys	Mon 06-04-17	Fri 06-06-30									█	█
28	Final Documentation and As Built Drawings	51 dys	Mon 06-05-22	Mon 06-07-31									█	█
29	Hand Over	0 dys	Mon 06-07-31	Mon 06-07-31										

Table 7. One Draft document part of Project time schedule(Source: “ Runway Resurfacing Project”)

5.0 CONCLUSION

In Kosova there are lots of difficulties on drafting and implementation of construction contracts; one of the reasons is the “Kosova Public Procurement Law” Law No. 2003/17, where much focus is on price and authority. Despite this fact is very difficult to have a quality construction works from selected company (at the companies where the procurement law is applicable). This master thesis document is based on research and information of construction project “Resurfacing of Runway, Taxiways and Apron” presented in chapter 3 and 4.

The construction contract was made according to International Federation of Consulting Engineers “FIDIC” guidelines precisely with -Conditions of Contract for Works of Civil Engineering, Construction Works (1987) known as “Red Book”. The “Red Book” is intended for civil engineering construction works carried out at the construction site.

All standard conditions used in contract document are considered fair and balanced to all the parties involved on the project, investor, consulting company, contractor and subcontractor. The contract conditions have been agreed by all parties involved on the project, which helped to eliminate possible misunderstandings and dispute. And the risk is allocated to the party that is best able to bear and control that risk.

In chapter 3 and 4, several times it is stated that this or that “shall” be in strict accordance with the Contract subject to approval of the Project Manager. Basically main executive power is given to project manager. The advantage is that the appointed project manager has to have Engineer professional background. The project manager is at the top of the project and has no conflict of power and authority with any other managers involved in project; everyone knows exactly their responsibilities and powers.

It is very crucial that risk management to be part of construction project because during the execution of contraction works can be occurred unexpected delays, rules breaching. Case presented in chapter 4, where the construction work has affected flight safety. In order to implement, correct construction method. The risk assessment session has been performed.

The approach that was taken was to try and identify the most suitable means for mitigation of unacceptable risks having in mind a system approach (people, procedures, equipment).

The central objective for the safety assessment is to ensure that the works on the RWY resurfacing will be acceptable level of safety (tolerably). Relevant parties that were involved in the process have tried to be as complete as possible in hazard identification during

Criteria's can be set in depends of the project needs. The RCS in general represent the environment where is supposed to be applied, therefore using a predefined RCS which is easy to be found in different publication was not considered an option. One considers that by employing one RCS throughout the project, it is much easier to convert the found outcomes to some future RCS rather than employing a generic RCS that can be found on different publications.

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