

# Accounting Control Technology Using SAP: A Case-Based Approach

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## ABSTRACT

*The Sarbanes-Oxley Act (SOX) revolutionized the accounting and audit industry. The use of preventative and process controls to evaluate the continuous audit process done via an SAP ERP ECC 6.0 system is key to compliance with SOX and managing costs. This paper can be used in a variety of ways to discuss issues associated with auditing and testing of internal controls. A case study is provided to effectively teach SAP system controls in undergraduate/graduate courses in auditing and information systems.*

**Keywords:** Risk And Compliance; Business Process Controls; Sarbanes-Oxley; SAP; AIS

## PRIOR RESEARCH AND BACKGROUND INFORMATION

This paper identifies the importance of internal controls in the field of auditing and the need to properly educate users of SAP systems. SAP is the leading pioneer in enterprise systems and is currently used in most Fortune 500 firms. More specifically, the uses of SAP internal controls are examined in mitigating the risk in a SAP Enterprise Resource Planning (ERP) system. A case-study is provided to analyze internal controls in a classroom setting to better prepare future system auditors for their professional careers. This case-study was developed and tested at Saint Joseph's University in Philadelphia, Pennsylvania. It is utilized in several of the financial core and auditing courses offered by the University within their accounting curriculum. Evaluation of controls shows how embedded preventative and process controls can enable the continuous audit process to prevent risk, reduce costs, and make the audit process more efficient. Classroom educating in this field demonstrates the minimum technical skills required for accountants to be productive in this evolving discipline.

The Sarbanes-Oxley Act (SOX), created in July of 2002, drove public companies to seek more accurate auditing information, internal controls, and disclosure, as well as cost savings. Research shows financial executives reported estimated cost increases in audit and external consulting fees, people-hours, and other vendor expenses. Prior to SOX, "the accounting profession failed to address the underlying issues regarding fraud, abuse and conflict of interest. Now the requirements of full disclosure, accuracy and transparency should lead to a more fair market for investors" (Sarbanes-Oxley: An Overview of Current Issues and Concerns, 2007). By 2005, companies that complied with SOX experienced better internal controls than those that did not. The embedded preventative and process controls streamline the continuous audit process, which reduces costs, while increasing the accuracy and depth of reporting by public companies on their end-of-year financial statements (Sarbanes-Oxley: An Overview of Current Issues and Concerns, 2007).

All controls in a system are governed by COBIT or the Control Objectives for Information and Related Technology. COBIT is a framework for developing, implementing, monitoring and improving information technology (IT) governance and management practices. COBIT framework is published by the IT Governance Institute and the Information Systems Audit and Control Association (ISACA). The goal of the framework is to provide a common language for business executives to communicate with each other about goals, objectives and results (Rouse, 2013). All consulting firms and companies set up their systems using the COBIT framework. Understanding this framework is a very valuable skill for students to learn as they enter the workforce. This framework also enables a system to audit itself. If the controls are working effectively and efficiently, the system

will either prevent errors from happening (preventative controls) or detect them while they are happening, so as to report the dysfunction and alert auditors (detective and output controls).

According to a 2006 PricewaterhouseCoopers study, companies use continuous auditing to “shorten audit cycle times and provide more timely risk and controls assurance” (PwC, 2006). In the same survey, PricewaterhouseCoopers found that 81% of 392 companies use continuous auditing or planned to do so (PwC, 2006). In general, continuous auditing process aims to reduce overall costs and distribute the work throughout the entire year. Simultaneously, continuous auditing, in conjunction with systems like SAP, can improve the accuracy and reliability of financial statements, while also reducing the time period to produce them. The controls present in SAP help the audit process by limiting the amount of errors and providing detailed reports on any error that may occur.

To meet the demands of public companies and accounting firms, business schools across the country have implemented SAP into the curriculum with varying degrees of success. Most schools implemented SAP on a limited course-by-course basis. Students also view SAP as an important way to gain real world applications that can be marketed to prospective employers (Rosemann and Maurizio, 2005). However, students experience difficulty with the complexity and scope of SAP. Most student issues are system-based rather than course-based (Rosemann and Maurizio, 2005). These issues revolve around controls pre-configured by the system administrators.

Teaching ERP systems cannot only improve the learning of business processes, it has also become a necessary tool for students in the new technological age. Bloom, Luchs, and Myring (2009) explain that internal auditors must now have strong technical skills in order to address enterprise-wide risk and governance issues through implementing technology and understanding the risks of that audit technology. CEOs confirmed this in a survey conducted by PwC in 2011: “Participants rated the more technical skills of knowledge within risk management approaches and specific technology expertise as the most important skills needed over the next three years (PwC, 2011)”. Therefore, to match the demand for increasing knowledge and familiarity of ERP systems, it is necessary to implement them into university business curricula. The best documented way to teach these technical skills is through applying hands-on applications within the systems. Finally, since an understanding of internal controls are essential for continuous auditing to be effective, it is imperative to incorporate tutorials on these controls as a segment in teaching audit and audit-related courses.

## **MOTIVATION AND METHODOLOGY**

The authors’ real world application scenario is based on a case developed by SAP. Students utilize SAP controls to perform internal audits. With these audits, students are likely to find a number of control errors. They create reports stating their findings recommending possible solutions to overcome the gaps they encounter. Saint Joseph’s University is a member of the SAP University Alliance and has access to live SAP clients fully configured with the Global Bike Incorporated case.

## **THE STARTRACKER CASE**

### **Company Information**

Global Bike Incorporated (GBI) is a fictional company that was created through the SAP University Alliance Program to enhance SAP classroom education (Magal and Word, 2012).

GBI is a world class bicycle company serving the professional and “prosumer” cyclists for touring and off-road racing. GBI’s riders demand the highest level of quality, toughness, and performance from their bikes and accessories.

GBI was founded in 2001 following the merger of two bicycle manufacturers - one based in the US and the other in Germany. GBI has three lines of business - deluxe and professional touring bikes, men’s and women’s off-road bikes, and bike accessories. GBI sells its bikes to a network of specialized dealers throughout the world and procures its raw materials from a variety of suppliers globally. Due to tax and export issues, GBI’s headquarters is

located in Dallas, Texas, and is registered under U.S. GAAP and the SEC as a public company. GBI has a subsidiary - GBI Europe - which is located in Fussen, Germany, and uses IFRS accounting standards and German tax regulations (Magal and Word).

In 2009, GBI adopted SAP Enterprise Resource Planning (ERP) software to integrate all of the aspects of the business. Prior to this, all functions of the business used independent application systems. The transition to SAP was beneficial to GBI because it centralized all the company's divisions and reduced costs globally.

With the new ERP system, many of the internal controls are automated within the system. Senior Management has enough experience over the years that he is able to navigate and do some basic analysis of the ERP system. However, he will most likely need to enlist the help of an ERP consultant to help him sort out where to look for all the relevant controls.

The following conversation occurred at GBI's Headquarters among Joseph Magar (CFO), Christopher Puccini (VP of Internal Audit) and Brandon Rosini (Independent Auditor):

**Joseph Magar:** *Complaints have been increasing with our employees using SAP. It is not as "automated" as I would like it to be. I wish that the system could reduce the amount of people-hours required to produce our financial statements in compliance with SOX.*

**Christopher Puccini:** *I agree. The system does a good job of eliminating paper and retaining files, but I'm not so sure it was entirely necessary. We spent a lot of money implementing the system and training our personnel.*

**Brandon Rosini:** *I think you both underestimate how effective the SAP system has been here. It automates many controls that are not all obvious to the user.*

**Magar:** *All I know is that it creates a lot of implementation issues. We made a huge investment in the system and need to justify the costs to our shareholders with tangible results. Could we be not seeing it as the glass is half-full?*

**Rosini:** *Not at all. The system has worked perfectly. It has five separate controls that have increased the timeliness and reliability of your financial data.*

**Puccini:** *If these controls are working so well, why don't we know about them?*

**Rosini:** *You do know about them, you just don't realize it. To create a system that is both reliable and secure, SAP must have valid input controls embedded in the master files and in the process. These input controls control the accuracy, completeness, and validity of the data entered. To implement these controls, all source documents are pre-numbered and maintained within the SAP ERP system. That way, it is easier to verify if documents are missing.*

**Puccini:** *Of all people, you know that we had a senior employee falsify documents to hit expectations. We adopted SAP to strengthen our controls. How do we know they are working effectively? What happens if someone puts in the wrong information, either intentionally or accidentally?*

**Rosini:** *This system has fixed that issue. Your control risk is much lower this year than in any previous year. You're receiving complaints because certain boxes can only contain certain information. Your employees are noticing the input controls which prevent them from inputting incorrect information. The system creates parameters based on everything within the system. If these parameters are broken, an error message will occur. For example, if GBI enters in the wrong plant to distribute bike accessories, the system will automatically show an error message that the plant cannot ship the goods. Unless the correct plant is selected, no distribution will occur.*

**Magar:** *That seems great, but my main concern is selling bicycles. If we're not moving product, we won't be in business very long and the whole SAP system will be irrelevant. How do we know if the purchase or sales cycle is complete?*

**Rosini:** SAP provides real-time reports about the sales cycle. You can easily check to see the movement of goods from a quote to payment from a customer. In the Sales Process, if the Sales Order Number is 3, the Transfer Order, Picking Request, Post Goods Issue, and Invoice will all match up with the Sales Order Document in the Sales Order History Tab. There is a Document Flow that shows all related documents involved in any part of the process. You can look at the results of these through financial statement analysis, SAP HANA, or the balance score card. Each of those will be populated with up-to-the-minute information based on the inputs of all employees.

**Puccini:** That's incredible. So you're saying that an SAP ERP system automatically sends the financial, material, stock updates, and the updated general ledger documents within the SAP system and they are stored for reference? That will make the internal and external auditing process much easier.

**Rosini:** Yes, and you can view them at any time, day or night, with a few clicks.

**Magar:** That's all great. It might help senior management make better decisions, but how are we going to justify this cost to the shareholders? They only care about the bottom line. Are there any other controls in SAP that help us reduce costs and save time?

**Rosini:** Yes, many controls have reduced costs and save time. We have noticed a 25% savings in audit costs through implementation of the SAP ERP system. In addition, role and user approval processes have been cut by a full business week.

**Magar:** Impressive, but what controls would those be?

**Rosini:** One example is an availability check. If GBI is trying to sell materials, the system will automatically check to see if GBI has enough materials to sell. If not, that obviously means GBI needs to produce or buy more materials to sell. In essence, the transaction cannot be completed unless GBI has the materials required to do so.

**Magar:** So it helps us manage our inventory better which reduces back-orders. How do we know when materials are actually in our warehouses and plants?

**Rosini:** This is checked automatically through data matching in which data must be matched and confirmed before an action can proceed (Romney and Steinbart). In the purchasing process, we record the goods received with credit to a GR/IR account. The goods are then included in our warehouse. A material document will also exist to move the material from loading dock in the warehouse to a specific storage location. When we pay off the vendor, the GR/IR account is debited. The account should have a zero balance afterwards. A non-zero balance indicates we haven't paid.

**Puccini:** I guess we were taking advantage of many features without knowing it. Maybe SAP was worth the cost after all.

**Magar:** I agree this is a great sales pitch and we heard this before we decided to implement SAP, but do the controls really work? Or is just something sounds great, but doesn't work as advertised?

#### **STARTRACKER: HOW TO USE THIS CASE**

Prior to the use of this case, it is important that students be provided with an understanding of business processes and specifically, the sales order process. The hands-on experience of doing a sales order to cash application within SAP is particularly valuable.

Global Bike Incorporated is a company that specializes in manufacturing and selling racing and off-road bikes. The order-to-cash process in SAP usually follows the steps as shown below:

1. A customer calls or emails a sales representative to place a sales inquiry. If the customer is new, the sales representative must create a master file for the customer.

2. After the inquiry is created and the customer receives the quoted price, the customer will then place an order with a sales representative authorizing the creation of a sales order.
3. After the sales order is created, the next step is for the goods to be picked by a warehouse employee to fill the order.
4. The goods are then transferred out for delivery by the shipping personnel.
5. The customer receives the goods and is invoiced by the billing department.
6. The customer makes payment after receiving the goods and the invoice, and the accounts receivable clerk clears the customer's account.

After students have knowledge of the company and its sales process, an overview of the various types of application controls and how they work is particularly important. Application controls are input controls, processing controls, and output controls. Input controls are intended to prevent, detect, or correct errors during data input; thus, they should help ensure the accuracy and completeness of any data that are input. Processing controls are intended to ensure accurate and complete processing. Output controls are intended to ensure that output is properly distributed and disposed of and that it is accurate and complete.

This case has been utilized in accounting information systems and auditing courses with great success. In conducting a test of transactions, students become familiar with how the process works and can answer essential questions, such as what systems-based audit controls should exist prior to conducting an audit. Using the appendices noted in this paper, students are able to experience how a well-designed accounting application system provides master files that direct information into a major business process. If these field controls are in place, the system will not only work effectively, but identify common process errors that need to be rectified.

Feedback from students indicates a high level of satisfaction and that they get exposure to a real-life system and hands on learning.

#### **AUTHOR INFORMATION**

**Joseph Ragan** is Professor and former Chair of the Department of Accounting at Saint Joseph's University where he also received his undergraduate degree. He has a graduate degree from the Wharton School (University of Pennsylvania) and Villanova University. Professor Ragan specializes in research on the development of software packages that enhances top management's use of accounting information. He is the author of several books along with 32 published articles. He has also served as a systems consultant to a number of Fortune 500 companies and has served on the Executive Committee of the PICPA, as well as several Boards of Directors. Email: [jragan@sju.edu](mailto:jragan@sju.edu). (Corresponding Author)

**Christopher Puccio** is a recent graduate who majored in accounting at Saint Joseph's University. As a student at Saint Joseph's, Christopher is a STAR consultant, a participant in the Volunteer Income Tax Assistance (VITA) program, President of Sigma Pi Fraternity, and a member of Beta Gamma Sigma - the international honors business fraternity. Together with Joseph Ragan and Brandon Talisesky, Christopher has co-authored one other paper. In the fall of 2014, Christopher will begin a full-time position as an associate in audit at PricewaterhouseCoopers in Philadelphia. Email: [CP540948@sju.edu](mailto:CP540948@sju.edu).

**Brandon Talisesky** is a recent graduate who majored in both accounting and decision and systems sciences at Saint Joseph's University. Brandon has over three years of SAP ERP experience as a STAR consultant and is a certified SAP global consultant. He also has led alternative spring break service trips to Appalachia and is a member of Beta Gamma Sigma. In addition, along with Joseph Ragan and Christopher Puccio, Brandon has co-authored one other paper. In the Fall of 2014, Brandon will be working for PricewaterhouseCoopers as a SAP consultant in New York City. Email: [bt539565@sju.edu](mailto:bt539565@sju.edu).

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APPENDIX

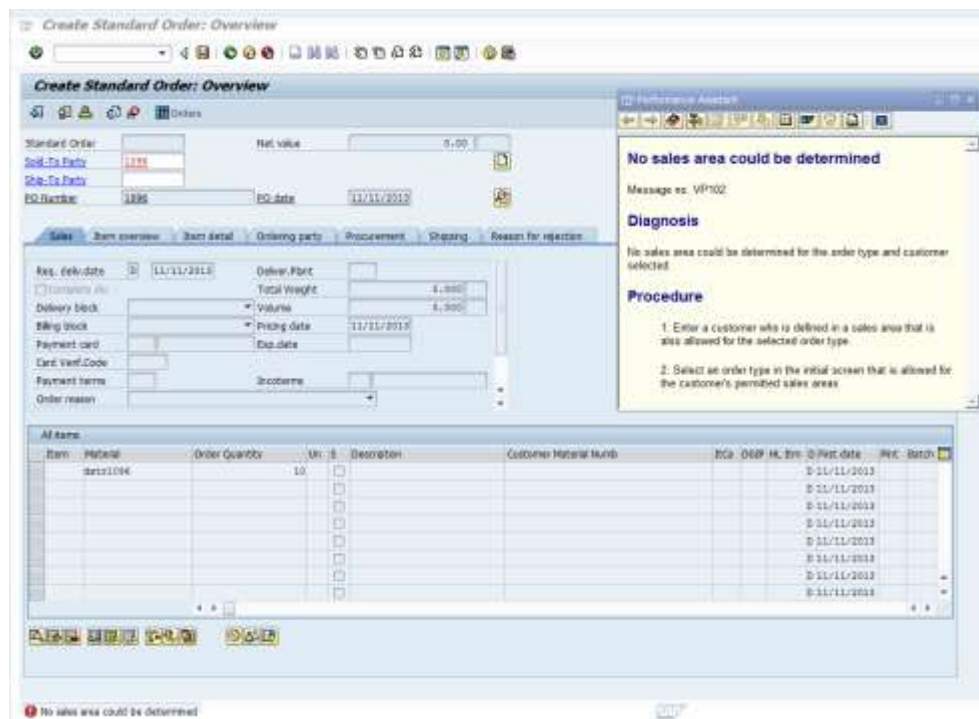
Appendix A: Input Controls From Accounting Information Systems

Process Stage	Threat/Risk	SAP Controls
<ul style="list-style-type: none"> <li>Source Data and Prep</li> <li>Source Data Collection and Entry</li> <li>Accuracy, Completeness, and Authenticity Checks</li> </ul>	Data that is: <ul style="list-style-type: none"> <li>Invalid</li> <li>Unauthorized</li> <li>Incomplete</li> <li>Inaccurate</li> </ul>	<ul style="list-style-type: none"> <li>Form Design</li> <li>Storage of Documents</li> <li>Authorization and Segregation of Duties Control</li> <li>Data Entry Controls</li> </ul>

Examples Of Input Controls

- Validity Check:* Examines a field to ensure that the data entry in the field is valid compared with a pre-existing list of acceptable values.

  - In the illustration below, a customer is selected that is not assigned to be sold in the sales area designated for the sale of deluxe bicycles. This hard-code error will prevent a sale until a valid customer is chosen.



2. *Field Control:* Required to determine availability of product for sales and shipment

- Below, the availability check box has not been filled. The system will not allow the user to create the master file until the field is occupied with the correct designation.

The screenshot shows the SAP Sales General/Plant form for material EPAD1096 (Elbow Pads) at plant DL96. The form is divided into several sections:

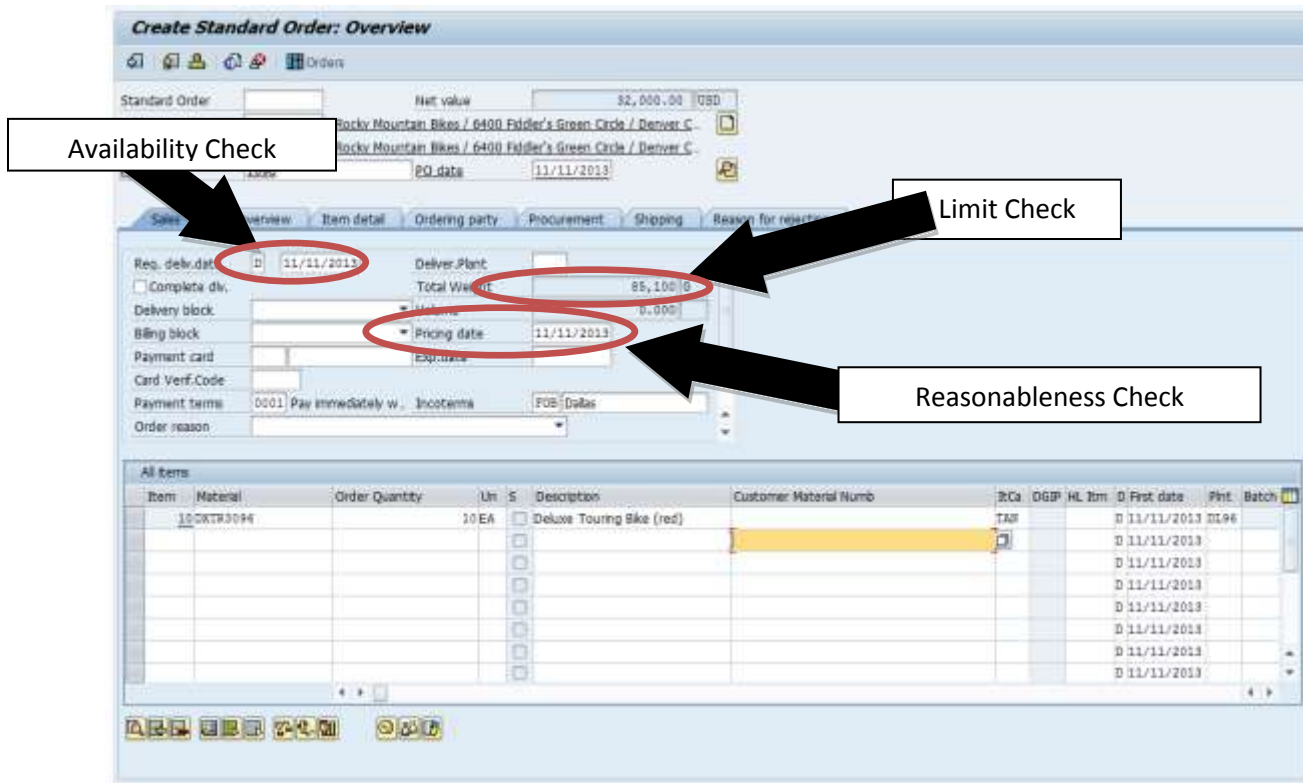
- General data:** Base Unit of Measure (EA) each, Gross Weight (32 OZ), Net Weight (32), Availability check (unchecked), Replacement part (unchecked), Qual.f.FreeGoodsDis. (unchecked), Material freight grp (empty), Appr.batch rec. req. (unchecked), Batch management (unchecked).
- Shipping data (times in days):** Trans. Grp (0001), On pallets (unchecked), LoadingGrp (checked), Setup time (empty), Proc. time (empty), Base qty (empty EA).
- Packaging material data:** Matl Grp Pack.Matls (empty).
- General plant parameters:** Neg.stocks (unchecked), Profit Center (empty), SerialNoProfile (empty), DistProf (empty), SerializLevel (empty).

A red box highlights the 'Availability check' checkbox, which is currently unchecked. A yellow button labeled 'Ext. customer repl. parameters' is located at the bottom right of the form. At the bottom left, there is a red exclamation mark icon and the text 'Fill in all required entry fields'.



3. *Availability Checks, Limit Checks, and Reasonable Checks:* Below are examples of each of the following field controls:

- Availability Check: Checks inventory availability for delivery on date requested
- Limit Check: Checks to see whether shipment is possible given truck capacity
- Reasonableness Check: On this date, does the selling price exceed the cost of the product? If not, an error log will appear.



**Appendix B: Process Controls From Accounting Information Systems**

Process Stage	Threat/Risk	SAP Controls
<ul style="list-style-type: none"> <li>Processing Integrity and Validity</li> </ul>	<ul style="list-style-type: none"> <li>Errors in output and stored data</li> </ul>	<ul style="list-style-type: none"> <li>Data Matching</li> <li>File Labels</li> <li>Database Processing Integrity Controls</li> </ul>

**Examples of Processing Controls**

1. *Document Flow*

- Tracks the sales order throughout the sales process. In the example below, the sales process is complete via a payment from the customer.

The screenshot shows the SAP 'Document Flow' interface. At the top, it displays 'Business partner 0000001096 Rocky Mountain Bikes' and 'Material DXTR3096 Deluxe Touring Bike (red)'. Below this is a table of documents:

Document	Quantity	Unit	Ref. value	Currency	On	Status
Standard Order 0000000094 / 10	10	EA	32,000.00	USD	11/11/2013	Completed
Outbound Delivery 0080000092 / 10	10	EA			11/11/2013	Completed
Picking request 20131111 / 10	10	EA			11/11/2013	Completed
GD goods issue:delvy 4900000437 / 1	10	EA	14,000.00	USD	11/11/2013	complete
Invoice 0090000090 / 10	10	EA	32,000.00	USD	11/11/2013	Completed
Accounting document 0090000000	10	EA			11/11/2013	Cleared

**Appendix C: Output Controls From Accounting Information Systems**

Process Stage	Threat/Risk	SAP Controls
<ul style="list-style-type: none"> <li>Output Review, Reconciliation and Error Handling</li> </ul>	<ul style="list-style-type: none"> <li>Use of inaccurate or incomplete reports</li> </ul>	<ul style="list-style-type: none"> <li>Reviews and Reconciliations</li> <li>Encryption and Access Controls</li> <li>Parity Checks</li> <li>Message Acknowledgement Techniques</li> </ul>

**Examples of Output Controls**

1. *Revenue Verification*
  - Verify if revenue was posted correctly

**Display Document: General Ledger View**

Display Currency    Entry View

**Data Entry View**

Document Number	90000000	Company Code	US96	Fiscal Year	2013
Document Date	11/11/2013	Posting Date	11/11/2013	Period	11
Reference	1096	Cross-Comp.No.			
Currency	USD	Texts exist	<input type="checkbox"/>	Ledger Group	

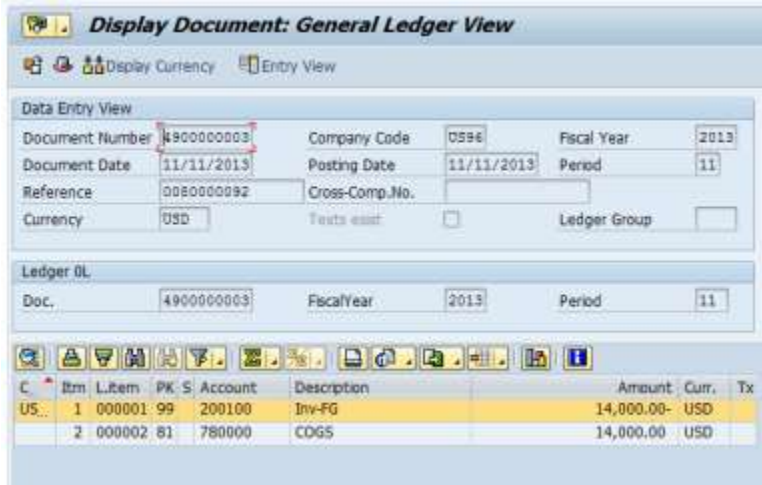
**Ledger OL**

Doc.	90000000	FiscalYear	2013	Period	11
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C...	Itm	L.item	PK	S	Account	Description	Amount	Curr.	Tx
US...	1	000001	01		110000	Trade Receivables	32,000.00	USD	
	2	000002	50		600000	Sales Revenue	32,000.00-	USD	

2. Cost of Goods Sold Verification

- Verify if Cost of Goods sold was posted correctly



3. Status Control Verification

- Review status of the Sales Order



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