Project Proposal

PARTS

Procurement Access Record Tracking System

Developed for Boeing Corporation
By Group B – MIS 6840

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1.0 Management Summary

The proposed system is built on the features of MS Access applications. The system will require logging-in procedures to access the data. There are three types of access: read-only, update, and system administration. Update access will be limited to personnel of the Provision Department through identification of user ID and the database will keep record of identities of users who update the information. The system will provide Post Delivery Support personnel with the most updated part information as well as the records of history of changes, including all the part number changes and modifications in terms of quantity, lead time, and the other fields. Upon users' requests, the system can produce data change reports by aggregating and categorizing information stored in the database.

The proposed system can operate within the current business process. Microsoft Access provides an easily learned interface and requires minimal training. The cost of installation and maintenance is expected to be at a low level because Microsoft Access is a popular software package incorporated in the MS Office system. The total costs of implementing the proposed system are estimated to be $15,720 for the first year, which include the design and programming costs of $8,640 and the backup, testing, and training costs of $7,080. The yearly maintenance costs are assumed to be 10% of the initial costs ($1,572) in the cost-benefit analysis.

The proposed system is expected to produce both tangible and intangible benefits. It is estimated that there will be a cost saving of $38,400 per year ($19,200 for the fist year) through recovery of lost time and a saving of $2,400 per year (not including the first year) by reducing vendor penalty charges. The cost-benefit analysis indicates that the

benefits outweigh the costs by $3,480 for the first year and by $39,228 for the subsequent years. Moreover, the proposed system will help strengthen data security, improve employee job satisfaction, and enhance relationship with vendors and customers by avoiding error-induced friction.

2.0 Current System Description

The current system is utilized by Boeing for support and maintenance of airplanes that are already built and are in use. Customers that own the airplanes contact Boeing for coordinating replacement parts and for upgrades. For example, a customer may request that Boeing obtain spare parts for their planes for the next year.

The provisioning department puts together a list of parts the customers may need in the future. This information consists of part numbers, suppliers, and costs.

The post delivery support department uses the list built by the provisioning department to order parts upon customer request. The post delivery support department works with the suppliers in ordering the parts. The supplier procurement process is out of the scope of this system—it is another system.

The list that is utilized is an Excel spreadsheet. Only the provisioning department updates the spreadsheet. Updates include adding new information and making changes when part number changes occur. New information is added when the department predicts what parts will be needed in the future. Part numbers change because: (a) parts become obsolete, (b) part numbers may be collapsed (combined) into a kit, and (c) plane configurations change.

The post delivery support department uses the spreadsheet for retrieval purposes only. This area looks at: (a) what suppliers belong to a buyer (the person that needs to

go buy parts from the supplier), (b) the quantity of parts per supplier, (c) the lead time (time from when the order was placed to when it will be delivered) to see what needs to be ordered first, and (d) the quantity per part number.

3.0 What is the problem?

The problem is being able to manage and be knowledgeable of part number changes. The current system worked adequately in the past when the quantities were much lower. If a part number changed, it was easy to verbally communicate this information between the departments. However, the quantity of parts is now much larger, and the two departments are not able to manage the changes utilizing the spreadsheet. Verbal communication of the changes is also no longer practical. Changes are often communicated via email. However, email change notes become overwhelming and spreadsheet updating becomes unreliable.

The current part number and quantity tracking system produces redundant and inaccurate data: changes are not always incorporated, and changes are not always noticed. There is no method to flag that a change has been acknowledged and incorporated. Inaccurate data can result in the ordering of incorrect parts or incorrect quantities. When this occurs, the wrong part or quantity must be cancelled and there is frequently a cancellation charge. It is important for the post delivery support department to know when changes occur, so that they can appropriately order the correct parts for their customers.

4.0 Technical Feasibility:

The basic operating system deployed throughout all departments at Boeing is Windows 2000. Therefore any solution needs to be Windows compatible. There are

many vendor "out of the box" software packages available for windows. Additionally, Boeing management has mentioned that all users have Microsoft Access installed on their desktop PC's, and common storage servers are available to all. Thus these readily available and common servers can provide network linking for all of the users, and Microsoft Windows will provide the common user platform for whatever solution is chosen.

An initial look shows that either a Microsoft Access application or a Windows based packaged software would be a good candidate, and would offer low technical risk. Many of the Boeing users already have Access applications on their desktops. These applications were not developed by the IT department, but by select departmental users who maintain Access applications without IT support.

5.0 Organizational Feasibility:

The new system will propose no organizational changes. The business process will primarily remain the same. Training for users will be designed to be kept to a minimum by designing simplicity into the solution. We will work with the business units to understand their concept of "simple" and to ensure acceptance of the solution. Currently Boeing management has indicated that all users understand the need for a better system, and are willing to support an improved system. Our research has validated this position. Users from both areas responded that they lose from 1 to 10 hours per week due to the old system. (See Appendix C)

6.0 Schedule Feasibility:

Based on experience from similar projects we have estimated the hours required to design, develop, test, and implement a solution using Microsoft Access. There is no critical schedule deadline at Boeing. The current project at Boeing, for which we were given example data, was started more than a year ago. A solution could be tested using the example data, and then transitioned at a point that is convenient to Boeing. See Appendix I for an outlined project schedule.

7.0 Legal and Contractual Feasibility

There are no legal or contractual constraints when using a Microsoft Access application to solve the current data problems. Boeing already has licensing rights to Microsoft Access on all of its desktop installations. If a third party software solution is implemented, we must assure that proper contracts and licensing documents are established. The problem of liability, should the project fail, must also be considered. However, successful completion of this project should lower Boeing's exposure to liability for cancelled or erroneous orders.

8.0 Political Feasibility:

The primary entities of concern at Boeing are the Provisioning department and the Post Delivery Support procurement department. Both user groups are aware that the current system causes them significant data accuracy problems, and believe the specified features are important and useful. (See Appendix C) The proposed solution will enhance information distribution and accuracy to all stakeholders.

9.0 Economic Feasibility:

The Economic feasibility is based on a cost to benefit analysis which indicates that the new system will provide tangible payback well within two years. Boeing management has stated that a two year payback would be appropriate for a project of this type. Boeing provided data that indicates the current system is costing approximately $48,000/year in direct labor plus an additional $3,000 in order cancellation fees. Providing a system that can help reduce this labor cost and order cancellation fees would thus provide a tangible benefit. Additionally, intangible costs include employee dissatisfaction with the current system. Boeing reports that the current system users, on all ends, are unhappy with the Excel Based Spreadsheet system's inaccuracies and redundant data. Providing a system to that can resolve these inaccuracies and redundant data would thus provide an intangible benefit of improving employee satisfaction.

There will be one time costs associated with designing and testing the new system, and there will be start-up costs that include training. These costs will depend on the solution approach that is implemented. In the following section entitled "Probable Types of Solutions and Costs", we list several potential solutions along with preliminary cost data for implementing each. Following this is a section that describes possible benefits and related dollar savings. Lastly, the comparison of costs versus benefits is summarized in table format.

9.1 Probable Types of Solutions and Costs

At this point, our team has researched several probable solutions. These potential solutions will be researched further in the Requirements phase as we work with Boeing to further define requirements for a new system:

1. Custom system created using Microsoft Access database software.
2. Off the shelf purchasing software package.
3. Maintain status quo.

Due to our specialized requirements, our choice of viable systems is limited. Access is already loaded on the users' desktops, and is capable of meeting all requirements. We found several purchasing/procurement software packages that would meet all user requirements; however the cost may be prohibitive.

Initial investigation shows that a Microsoft Access solution could be implemented at a cost to Boeing of **$15,720.** A detailed explanation of this estimate is contained in Appendix D.

Purchased packages are also available, and some that we have found include:

- QPII Gold from Dynamic Software – priced at $14,000 for 10 concurrent users.
- Purchasing *plus*+ by Palmas priced at $15,000 for 10 concurrent users.
- ProcureIT from Verian Technologies starts at $50,000.
- eProTeus CMMS from Eagle Technology priced at $24,995 for 3 concurrent users.

The prices shown for the packages do not include the cost of customization to meet Boeing application needs, the cost of testing to assure compatibility with current Boeing software and operating systems, and the annual maintenance fees. The "Volkswagen" solution, and the apparent best solution at this stage, appears to rest with a custom Microsoft Access application.

These hourly estimates were derived by comparisons to other similar existing systems our project team is familiar with, in size and complexity. These items are initial thoughts at this point in the process, and will be further refined in future project phases. Database design has been determined to be the most critical aspect of building this new system. Projects of similar size and complexity where the data was fairly well defined, as is the case with this project, averaged around 40 hours for database and screen design. At this point we have estimated five screens for the following functionality: search/retrieval, updates, display history, add/change userid security, and a login screen. It is estimated that each screen will take 8 hours for both programming and testing. We have estimated four reports for the following functionality: a history of changes for a specific part, a history of changes made by a specific user, a history of changes within a specific date range, and a history of changes related to a specific supplier.

These hourly estimates were again derived by comparisons to other existing systems our project team is familiar with, and will be further refined in future project phases. For testing, we are estimating one user from each affected department—provisioning and post delivery support—will need to test the new application, as they will be using the system in different ways. Due to comparisons against testing other equivalent size systems, we are estimating each user will test for 8 hours. These two testers will test at the same time. During this time, the programmer consultant will be working with the testers and resolving any problems found.

One of the items stressed by Boeing during initial interviews was that the new system must be easy to learn. The new system will be designed for this, and the amount of functionality the system needs to provide is fairly limited. As a result we are confident

that only one hour of training per user would be required. This training would be phased so that not all users were out of their department at the same time. Thus we are estimating it will take eight hours of the programmer consultant's time.

9.2 Benefits

Based on our knowledge of the project, benefits of a new system have been estimated as follows.

Tangible Benefits:
1. Recovery of lost time: (20Hr/wk * 40 wk/yr * $60/hr) = $48,000
2. Reduced vendor penalty charges due to incorrect orders: ($3,000 to date)

Intangible Benefits:
1. Improved data security
2. Improved employee satisfaction
3. Improved relationship with vendors (less error-induced friction)
4. Improved relationship with customers (less error-induced friction)

9.3 Constraints and Risks

There are several constraints and risks associated with this project that must be considered. These are important items to keep in mind and to manage in order to provide a successful solution.

Constraints
1. The system must operate within current business processes.
2. The system must be of low cost.
3. The system must require little training.
4. The system must be easy to set up and maintain, with no support required from I.T.

Risks

Decreased contact between the two departments may increase the chance of order error in some unusual cases. For example, incorrect data may be entered by the provisioning department. In the past, the post delivery department contacted the

provisioning department by phone, email, or in person to figure out the changes. This provided an opportunity for additional confirmation and error detection. With the new system, this mechanism will vanish and errors will stay if they occur. However, we can reasonably assume this risk is extremely low, and will strive to build checks and balances into the new system in order to mitigate this risk.

The new system may be perceived by users to be complex and unfriendly. Such negative attitudes toward the new system may inhibit user acceptance and offset its benefits. This is an area where we will employ user input and user involvement to help mitigate this risk.

9.4 Cost-Benefit Analysis

The following table summarizes the costs described above for a Microsoft Access customized solution and compares it to the benefits that potentially could be achieved by implementing a new system.

In the summarized table below, it was assumed that yearly maintenance of the system to provide enhancements and troubleshoot production problems would be 10% of the initial cost. It is assumed changes and problems will be minimal with a system of this size.

For every year after the initial year, it was assumed that there would be an 80% savings of the $48,000 spent in lost time (thus $38,400) and an 80% savings of vendor penalties of $3,000 (thus $2,400). It can not be assumed there would be a 100% savings. However, we estimate a new system would result in a significant portion (80%) of savings.

Additionally, it was estimated that the system would be developed in well under six months based on previous hourly estimates. As a conservative estimate, we assumed 6 out of 12 months savings on the regain of lost time – thus a 50% savings the first year over what is saved each subsequent year (50% of $38,400 = $19,200).

This table shows the benefits outweigh the costs of implementing a new system. The first year the benefits outweigh the costs by $3,480. Each year after that the benefits outweigh the costs by $39,228. Thus it is economically feasible to implement a new system.

10.0 Objective of Proposed System

The proposed system is designed to solve the above problems using a Microsoft (MS) Access database application. A one-page questionnaire (see Appendix B) was distributed to the users to gather information about user requirements and the potential benefits of the proposed system. The survey results are summarized in Appendix C. The data from the questionnaire verifies that the stakeholders recognize the problem and like the proposed solution. The resulting specific requirements are described below in section 11.0.

The system will require logging-in procedures to access the data. There are three types of access: read-only, update, and system administration. Update access will be limited to personnel of the provision department through identification of user ID and the database will keep record of identities of users who update the information. The system will provide the most updated part information as well as the records of history of changes, including all the part number changes and modifications in terms of quantity,

lead time, and the other fields. Upon users' requests, the system will produce data change reports by aggregating and categorizing information stored in the database.

11.0 Specific Requirements

The objectives of the proposed system were translated into a prioritized list of new system requirements. Based on the feedback from the client, these requirements were divided into two lists – those that are required (must haves) and those that are nice to have. Please refer to Appendix E for our list of requirements. These requirements have been incorporated into a proposed prototype. A description of this prototype is contained in Appendix F.

12.0 Programs, Reusable Modules, & Objects

This system will be built using Microsoft Access. The features of Microsoft Access will be utilized both for development of the system as well as for running the system. The screens will be built utilizing MS Access forms. The reports will be built using the reporting feature of MS Access.

Any complex code needed can be programmed within this framework, primarily as event driven. For example, when a person clicks on a command button such as the one to update a part record, this triggers an event to occur. When this event occurs, it triggers program code to run. For the example of the update part record button, we will add program code so that when this button is clicked a copy of the current part record will be added into the history table before the current part table is updated.

The prototype description summarizes the screens and reports that will be created and the functionality each screen and report will perform. This should be utilized as a guide for development of the actual system.

13.0 Files & Databases

The data for this system will be stored in Microsoft Access, which is a relational database. The data will be divided into tables. Each table is similar to the concept of an Excel spreadsheet, in that there are columns for different fields such as part number. Additionally, each row is a unique record. See Appendix G for the recommended Data Dictionary.

The current system's Excel spreadsheet data will be converted through MS Access programs to populate the new database. These programs will be created during the development phase. The userid information will need to be manually keyed into the new system, since this was not part of the current system.

14.0 Network & Telecommunication Requirements

The proposed MS Access system will need to reside on a file or application server that all users of the system can connect to from their PCs through their local area network. This server can be an existing shared server. The server must have a Windows operating system.

If the MS Access system is place on a server that the users connect to over a wide area network instead of a local area network, additional items may need to be put into place if performance levels are unacceptable. These solutions may include Citrix Metaframe or Microsoft Terminal Server (MTS). However, the cost of these solutions may be prohibitive if there are not existing servers of this type that can be shared. Our recommendation is therefore to place the system on a server that can be reached from the user PCs via a local area network, in order to provide acceptable performance without having to go with a Citrix or MTS type solution.

Icons can be placed on the users' desktops that are shortcuts to the new MS Access system on the server. MS Access will need to be installed on any of the user PCs that do not currently have this software.

15.0 Preliminary System Test Plan

The PARTS system contains 8 screens and 4 reports which will need to undergo testing. Because we are making use of the existing infrastructure, including the database system, our test plan can focus on the performance of the application itself.

We will begin with the two users unit testing each individual screen and report, screen printing each step as they progress. We have budgeted two half days (4 hours) for each user. We will also have the post delivery user attempt to access the provisioning screens. The contractor will test the User Security Window.

The System Test will consist of users comparing the data contained in their printouts against the original data. The users would also then check the reports for accuracy. We will further test security on the system during our training session by having the users attempt to login to all screens, and logging any discrepancies between intended and actual access capabilities. See Appendix H for Preliminary Systems Test Plan sheet.

16.0 Conclusion

In summary, three questions must be addressed:

- Does this solve the problem?
- Is this cost effective?
- Is this solution low risk?

The PARTS system will improve the quality of data, will reduce the time lost verifying changes, will track change history, and will increase data security. This solution is inexpensive, intuitive, and easy to maintain. The risks involved with implementing this system are miniscule when compared to the risk of keeping the status quo. The answer to all three questions is yes. This is a project that will benefit Boeing.

Appendix A
Data Flow Diagram for the Current System

Appendix B
Questionnaire

Questionnaire

1. What area are you in?
   ___ Provisioning
   ___ Post Delivery Support
   ___ Other _____

2. What functions do you perform on the data in the spreadsheet? (Check all that apply):
   ___ Read
   ___ Modify
   ___ Add

3. Indicate what you would like in a new system:

	Not Important				Very Important
Flag the user when something has changed:	1	2	3	4	5
Track change history:	1	2	3	4	5
View change history:	1	2	3	4	5
Limit update access to specific users:	1	2	3	4	5
Provide read-only access to specific users:	1	2	3	4	5
Know who makes changes:	1	2	3	4	5
Producing data change reports:	1	2	3	4	5

4. Is there any functionality not listed in question #3 that is important to include in a new system?
   _____
   _____
   _____
   _____

5. Rank each of the following based on how much time is lost due to each:

	Very Little Time Lost				Significant Time Lost
Not knowing about or inability to communicate part number changes:	1	2	3	4	5
Wrong parts ordered:	1	2	3	4	5
Redundant (duplicate) data:	1	2	3	4	5
Not knowing a history of the changes:	1	2	3	4	5
Not knowing who made certain changes:	1	2	3	4	5

6. How much time do you spend talking to the other department regarding data on the spreadsheet, including redundant (duplicate) data, part number changes, and other clarification: (Round up to the nearest hour)
   ___ None
   ___ 1 hour per week
   ___ 2 hours per week
   ___ 3 hours per week
   ___ 4 hours per week
   ___ 5 hours per week
   ___ 6 hours per week
   ___ 7 hours per week
   ___ 8 hours per week
   ___ 9 hours per week
   ___ 10 hours per week
   ___ More than 10 hours per week

Appendix C
Questionnaire Results

Summary of Survey Results

What area?	1 Prov	2 Prov	3 PostD	4 PostD	5 PostD	6 PostD	7 PostD	Average
What functions?								
Read	x	x	x	x	x	x	x	
Modify	x	x				x		
Add	x	x						
What would you like?								
Flag user - changes	5	5	5	5	5	5	5	5
Track change history	5	5	5	5	5	4	5	4.85
View change history	5	5	5	5	5	5	5	5
Limit update access	5	5	5	5	5	5	5	5
Provide read-only access	5	5	5	5	5	5	3	4.71
Know who makes changes	5	5	5	3	5	5	5	4.71
Produce data chg reports	5	5	5	5	5	5	3	4.71
Any functionality not listed	-	Reports	-	-	-	No	Reports	
Time lost due to: Inability to communicate								
Part change	3	3	3	3	4	3	3	3.14
Wrong parts ordered	2	2	2	2	2	1	2	1.86
Redundant data	3	3	3	4	3	1	4	3
Not knowing chg history	2	3	2	2	1	1	3	2
Not knowing who made chg	3	3	2	1	2	1	3	2.14
Amount of time lost	10+	10+	2	2	2	1	1	*

Notes: Time lost will be hard to calculate, since we hit the upper limit on the provisioning side

The highlighted cell represents an unexpected answer that may be error response.

Appendix D

Total Estimated Costs for an MS Access Solution

MS Access Cost Estimates:

Database and Screen Design: 40 hours
Converting data from existing system to new system: 24 hours
Programming Screen Functionality (8 screens @ 8 hours each): 64 hours
Programming Reports (4 reports @ 4 hours each): 16 hours
Sub total: 144 hours

Additional tasks that apply to all solutions (MS Access OR Packaged Software):

Backup & Recovery Planning & Setup: 40 hours
Testing: (2 users @ 8 hours each): 16 hours
(Consultant @ 24 hours): 24 hours
Training: (30 users @ 1 hour each): 30 hours
(Consultant @ 8 hours): 8 hours
Sub total: 118 hours

Total Estimated Costs for An MS Access Solution

Total hours: 144 hrs + 118 hrs = 254 hours
Total cost: 262 hours x $60 per hour = $15,720

* Estimated consulting fees at $60 per hour for experienced programmer/analyst
Subtotal for Design and programming: 144 hours x $60 per hour = $8,640.
Subtotal for Backup, Testing, and Training: 118 hours x $60 per hour = $7,080.

Adding a confidence interval of plus/minus of 10% would leave us with 298 hours at the high end, for a project total of $17,880. This figure is still below our conservative first year total benefit of $19,200.

Appendix E
Requirements Document

Required Elements

- The system shall provide the capability for at least 10 concurrent users to read document.
- The system shall provide the capability for at least 2 concurrent users to update document.
- The system shall provide the capability to update part and supplier information.
- The system shall provide the capability to restrict access to update capability.
- The system shall be compatible with Windows 2000.
- The system shall have an intuitive, user-friendly interface that is will not require extensive training.
- The system shall maintain Data Accuracy.
- The system shall complete system updates in less than 5 minutes.

Nice to Have Options

- The system shall provide the capability to maintain history of changes made to supplier information.
- The system shall provide the capability to return all report results in less than 1 minute.

Appendix F
Prototype

Appendix G
Data Dictionary

Data Dictionary

Table	Caption	Field Name	Data Type	Description
Buyer	Supplier ID	Supplier	Text	ID of the supplier
Buyer	Buyer ID	Buyer_ID	Text	ID of the buyer
Current_Parts	Part Number	Part_Number _ID	AutoNumber	Number assigned by the system to identify the records in this table
Current_Parts	Current Part Number	Current_Part_ Number	Text	The current part number of the record
Current_Parts	Current Quantity	Current_Qty	Number	The current quantity to be ordered
Current_Parts	Current Lead Time (In Weeks)	Current_Lead_ Time_Weeks	Number	The current lead time of the part
Current_Parts	Supplier ID	Supplier	Text	The current supplier of the part
Current_Parts	Date Last Modified	Last_Modified_ _TS	Date/Time	Date of the last change to the record
Current_Parts	Last Modified By	Last_Modified_ By	Text	The initials of the user who made the last change to the record
Current_Parts	Num_Days_ Last_Changed	Num_Days_ Last_Changed	Number	Number of days since the last change to the record
History	History_ID	History_ID	Autonumber	Number assigned by the system to identify the records in this table
History	History_Part_ Number_ID	History_Part_ Number_ID	Number	The ID number of the record in the history of changes
History	Part Number	History_Part_ Number	Text	The part number in the history record
History	Quantity	History_Qty	Number	The quantity to be order in the history record
History	Lead Time (In Weeks)	History_Lead_ Time_Weeks	Number	The lead time in the history record
History	Supplier	History_Supplier	Text	ID of the suppler

Table	Caption	Field Name	Data Type	Description
				in the history record
History	Date Last Modified	Last_Modified_ TS	Date/Time	Date of the last change made to the history record
History	Last Modified By	Last_Modified_ By	Text	Initials of the user who made the last change to the history record
Users	userid	userid	Text	ID number assigned to the user
Users	First Name	First Name	Text	User's first Name
Users	Last Name	Last Name	Text	User's Last Name
Users	Initials	Initials	Text	User's initials
Users	Access	User_Group	Text	Type of access authorized to the user
Users	Password	Password	Text	Password assigned to the user
User_Group	User_Group	User_Group	Text	Type of access

Appendix H
Preliminary Test Plan

Test #	Test Description	Test Result
1	The post delivery support department can view all current part records.	___ Pass ___ Failed
2	The post delivery support department can view history for a specific part record.	___ Pass ___ Failed
3	The post delivery support department can search for a specific part record by part number, supplier, or buyer.	___ Pass ___ Failed
4	The provisioning department can add new records.	___ Pass ___ Failed
5	The provisioning department can update a part number, supplier, or any other details.	___ Pass ___ Failed
6	A history record is created upon update of a record.	___ Pass ___ Failed
7	The post delivery support department cannot update a part number, supplier, or any other details	___ Pass ___ Failed
8	Part information reports reflected correct data	___ Pass ___ Failed
9	Administrator is able to update security permissions	___ Pass ___ Failed

Appendix I
Project Schedule

Project Schedule

Task	Duration
Database and Screen Design	5 days
Programming Screen Functionality	8 days
Programming Reports	2 days
Convert data from existing system	3 days
Testing	3 days
Backup and Recovery Setup	1 week
Training	1 week
Total Duration	**23 days**

See Appendix D for details regarding each task.

This duration is based on a full time consultant and quick turn around on questions from the business unit. This is the fastest possible duration. If a consultant is utilized part time or encounters delayed business unit feedback, the duration could increase to six months.

Appendix J
Cost Benefit Schedule

	Year 1	Year 2	Year 3	Year 4	Year 5	**TOTALS**
Costs:						
Software Development	$15,720	0	0	0	0	$15,720
Yearly maintenance	0	$1,572	$1,572	$1,572	$1,572	$6,288
Total Costs	**$15,720**	**$1,572**	**$1,572**	**$1,572**	**$1,572**	**$22,008**
Benefits:						
Regain of lost time	$19,200	$38,400	$38,400	$38,400	$38,400	$172,800
Prevent Vendor Penalty Charges	0	$2,400	$2,400	$2,400	$2,400	$9,600
Total Benefits	**$19,200**	**$40,800**	**$40,800**	**$40,800**	**$40,800**	**$182,400**
Break-even Analysis Benefits - Cost	**$3,480**	**$39,228**	**$39,228**	**$39,228**	**$39,228**	**$160,392**