

## **Needs Analysis: A Case Study**

# **The Gold Mine vs. The Bus Company**

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## Needs Analysis: A Case Study: A Comparison of a Gold Mine and a Bus Company

### Commonalities

What does a **gold mine** in the middle of the Arabian Desert have in common with a **bus company** located in the Washington-Baltimore suburbs?

Seemingly nothing, but in reality, **a lot**.

### Common Performance Problem: Financial Loss

In relative degree of magnitude, each company's financial losses were worlds apart. Nonetheless, despite the differences in size of the two operations, the losses were critical to each:

- While the gold mine was experiencing losses in the **tens of millions** of dollars,
- the losses of **tens of thousands** of dollars might potentially have meant disaster for the bus company.

However, while financial losses may be common to many organizations, what was unique to these cases were the precise areas **where the major losses occurred** as well as the **nature of the losses**.

It is precisely these **common performance problems** experienced by two companies apparently so different that **form the basis of the following case study**.

Before getting to the specifics of the case study, is it necessary to look briefly at the process used to analyze an organization's needs. The process parallels the typical medical model with some important additions.

## **Steps in the Needs Analysis Process**

The steps in the process include the following:

- 1. Identify the Performance Problems:** *What is NOT happening that you want to have happen? Or, what is the discrepancy between the **should** and the **actual**?*
- 2. Identify the Symptoms of the Performance Problems:** *What are the indicators or facts that identify the existence of the Performance Problem?*
- 3. Identify the Possible Causes of the Symptoms:** *What are the possible human skills deficiencies (lack of training) and non-human skills deficiencies (lack of Resources, Environment, and/or Systems – R-E-S) that explain the existence of the Symptoms?*
- 4. Identify Possible Solutions to the Causes:** *What Possible Solutions will eliminate the Causes of the Symptoms?*
- 5. Collect data to verify the Performance Problems, Symptoms, Causes and Solutions:** *What combination of survey forms and personal interviews can be used to collect data from those most affected by the Performance Problems?*
- 6. Identify the Solution Mix of Training and Non-Training Solutions:** *What combination of Training and Non-Training Solutions will eliminate the Causes?*
- 7. Identify the Costs and Benefits of the Solution Mix:** *What are the Costs and the Benefits of each proposed Solution?*
- 8. Identify the Best Possible Solution Mix of Training and Non-Training Solutions:** *What is the mix of Training and Non-training Solutions that will provide the best Return On Investment (ROI)?*
- 9. Persuade the Decision-Maker(s) to implement the Solutions:** *What steps are needed to “sell” the decision-maker on implementing the proposed Solution Mix?*

## **Thumbnail Histories of the Companies**

### **Gold Mine in the Arabian Desert**

The gold mine is physically located below an original mine attributed to King Solomon. Geologist found substantial gold deposits below the surface of the area that had been mined several thousand years ago. In 1988 when the first ore was refined, it yielded 25 grams per ton of ore. By 1998, the yield was 18 grams per ton. By comparison North American gold mines generally yield on the average 9 grams per ton. With only half the yield of the Arabian mine, North American gold mines experienced continual profitability. Yet, despite twice the yield of North American mines combined with the most modern technology and advanced mining techniques, the Arabian gold mine continued to lose money year after year.

Working for almost two years, a team of US and British consultants failed to find a solution to the losses.

In the summer of 1998, the mine owners hired Dr. Esseff, along with a Lebanese assistant/translator, to replace the team of consultants. He conducted a two-month Training Needs Analysis, using ESF's process described above.

### **The Bus Company**

A bus company located midway between Washington and Baltimore primarily served commuters from the outlying rural areas traveling back and forth from both cities to the suburbs. The bus company was a family-owned, privately held organization.

The company had grown from a small independent bus line, founded by the father of the present owners some twenty-five years previously, to what is currently a major bus line serving the two large metropolitan areas. Virtually, all the employees (except for the drivers) were friends and neighbors of the family owners. Despite the modernization of equipment (buses), the introduction of computers into the accounting procedures, and advanced communication systems (between buses and dispatchers), profits continued to be marginal at best.

The owners contracted with Drs. Peter and Mary Esseff to conduct a Training Needs Analysis for the bus company.

## **Results From the Needs Analysis Process**

### **Performance Problem:**

The Performance Problem in both cases was similar if not identical. Both were experiencing **untenable financial losses**. Both had exhausted whatever means at hand to solve the problem without success.

### **Symptom:**

By examining available documentation and through preliminary interviews with appropriate personnel, a major Symptom surfaced similar in both cases: operating equipment failed to deliver the companies' products in a timely and effective manner.

In the case of the gold mine, the heavy-duty equipment used to extract and refine the ore was constantly in need of repair. In the case of the bus company, buses needed to service customers stood idle because they needed repair.

In the case of the gold mine, the estimated cost of the equipment downtime due to inadequate maintenance resulted in an annual loss of approximately ten million dollars. For the bus company, approximately five hundred thousand dollars a year was lost to the bottom line of the company's profit margin.

### **Causes:**

In both cases the Causes involved a combination of the categories of Resources and Organizational Systems.

### **Resources:**

In both the *gold mine* and the *bus company* the maintenance personnel were unable to perform their normal job responsibilities due to a lack of parts.

In the case of the *gold mine*, a large amount of time was wasted chasing down delayed spare parts needed to keep the mine and mill operating.

In the case of the *bus company*, buses needed for day-to-day operation sat idle. Often parts were on hand but could not be located.

In both cases, maintenance planners seemed to be doing little else but constantly chasing required parts. Consequently, the maintenance work was not planned or performed properly.

***Organizational Systems: Lack of Defined Job Responsibilities***

In the case of the **gold mine**, the person in charge of the parts department ruled it as a sovereign king over his personal empire. He exercised complete and **autocratic control**, receiving the absolute authority over the department from his close and long-time friend who had virtual command of the entire mining operation.

For example:

- 1.** The person in charge of the parts department severely reprimanded the maintenance superintendent for speaking to a supplier without permission.
- 2.** They had never conducted an inventory of warehouse stock.
- 3.** Obsolete parts abounded.
- 4.** Large numbers of critical new and replacement parts were unavailable.

In the case of the **bus company** a similar situation existed. Many years previous, the founder of the bus company had hired his close friend to take charge of the parts department. Although the founder had been retired for some time, leaving the management in the hands of his sons, in deference to their father, the sons were reluctant to interfere with the father's close friend.

Consequently, the parts department manager exercised the same **autocratic rule** as his counterpart in the gold mine. Access to the storage area of the parts department remained under lock and key at all times and no one, not even the maintenance superintendent, entered it without permission and close supervision of the parts department manager.

As in the case of the gold mine, the bus company parts department **lacked any inventory control**. While relatively fewer replacement parts were lacking compared to the situation at the gold mine, those that were lacking were absolutely critical to the continued operation of the buses.

## **Possible Solutions:**

The proposed solutions were **similar** for both the *gold mine* and the *bus company*.

Among the most important proposed solutions were the following:

- 1. Streamline purchasing procedures** (e.g., purchase orders and job orders) and form a new system of availability and accessibility to items needed on a daily basis by maintenance personnel.
- 2. Make available**, on a priority basis, **urgent and time-critical items**.
- 3. Implement an automated inventory system** immediately in both the gold mine and the bus company.
- 4. Provide training to designated personnel** (from the parts department manager the as well as those from the maintenance department) in how to use the new inventory system. Train an assistant to the parts manager in the use of the system to ensure the availability and timely access to all items in the parts department.
- 5. Provide individual maintenance departments** with the ability to flag critical parts.
- 6. Print availability of general use items** monthly but “critical spares” weekly.

## **Verification of the Performance Problem, Symptoms, Causes and Possible Solutions:**

In both the *gold mine* and the *bus company*, we interviewed all those affected by the *performance problem* and collected as much documentation as possible that demonstrated the **existence** and the **cost of the loss** created by the *symptoms*.

We carefully crosschecked the information received from the interviews with the documentation. For example, the downtime of mining equipment and buses was determined from actual documents. Those in charge of the maintenance programs carefully and conservatively calculated the dollar loss of the downtime. The interviews revealed *possible causes* of the existing symptoms and we crosschecked them with the documentation. *We solicited possible solutions* from the entire population combining similar proposed solutions and eliminating any clearly unfeasible solutions.

**Solution Mix:**

In both the *gold mine* and the *bus company*, the proposed solutions included a mix of training and non-training solutions.

The majority of proposed solutions were in the non-training category. The proposed training solutions were related to the introduction of the new inventory system in both cases.

**Costs and Benefits of the Solution Mix:**

***Gold Mine: Cost of Loss Due to Downtime - \$10 Million/Annual***

Solutions	\$ Cost	Expected Results	\$ Value	\$ Benefit
<b>1.</b> Streamline Purchasing	\$500K	(Reduce loss 10%)	\$1 Million	\$500,000
<b>2.</b> Prioritize Critical Items	\$10K	(Reduce loss 10%)	\$1 Million	\$990,000
<b>3.</b> Automate Inventory	\$1Mill	(Reduce loss 50%)	\$5 Million	\$4 Million
<b>4.</b> Train Use of Inventory	\$100K	(Reduce loss 10%)	\$1 Million	\$900,000
<b>5.</b> Flag Critical Parts	\$50K	(Reduce loss 10%)	\$1 Million	\$950,000
<b>6.</b> Print Availability	\$20K	(Reduce loss 10%)	\$1 Million	\$980,000
<b>TOTALS</b>	<b>\$1,680,000</b>	<b>(Reduce loss 100%)</b>	<b>\$10 Million</b>	<b>\$7,310,000</b>

***Bus Company: Cost of Loss Due to Downtime - \$500 Thousand/Annual***

Solutions	\$ Cost	Expected Results	\$ Value	\$ Benefit
<b>1.</b> Streamline Purchasing	\$25K	(Reduce loss 10%)	\$50,000	\$25,000
<b>2.</b> Prioritize Critical Items	\$.5K	(Reduce loss 10%)	\$50,000	\$49,500
<b>3.</b> Automate Inventory	\$150K	(Reduce loss 50%)	\$250,000	\$100,000
<b>4.</b> Train Use of Inventory	\$5K	(Reduce loss 10%)	\$50,000	\$45,000
<b>5.</b> Flag Critical Parts	\$2.5K	(Reduce loss 10%)	\$50,000	\$48,500
<b>6.</b> Print Availability	\$1K	(Reduce loss 10%)	\$50,000	\$49,000
<b>TOTALS</b>	<b>\$185,000</b>	<b>(Reduce loss 100%)</b>	<b>\$500,000</b>	<b>\$287,000</b>

**Note:** The costs and benefits comparisons contained in the above tables are approximations and are considered in orders of magnitude only. However, the ratios of costs to benefits turned out to be fairly accurate.

### The Solution Mix:

What is noteworthy is the fact that in both cases training was only one part of the solution. While training did represent a small part of the costs of the solution, it did reap a substantial part of the benefits in both cases. What is also noteworthy is the fact that training by itself was not sufficient; a mix of training and non-training solutions was necessary to eliminate the performance problem. In both cases, the proposed solution – based upon the analysis of costs and benefits – was indeed the mix of training and non-training solutions.

### Persuade the Decision-Makers to implement the Solution Mix:

The final reports were presented to the decision-makers in both cases, i.e., the owners of the bus company and the CEO and staff of the gold mine. The reports contained full back-up information with complete details supporting all the data included in the summary report.

The reports also included analyses of other performance problems with their symptoms, causes, solutions, costs and benefits that are *not included in this Case Study*.

The complete Needs Analysis included comprehensive back-up data in each instance supporting the proposed solutions.

What “sold” the decision-makers on implementing the proposed solutions in every instance was the **return on investment (ROI)**, i.e., the **analysis of the costs and benefits of the solutions**.





**Saudi Gold Mine**