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**INTEROFFICE MEMORANDUM**

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**TO:** MICHEAL GRIFFIN  
**FROM:** PAMELA MADERA  
**SUBJECT:** COLUMBIA SHUTTLE DISASTER  
**DATE:** 12/4/2007

**Summary**

Following the Columbia Shuttle disaster, Duane Deal, a member of the CAIB, stated that though foam may have been the cause of the disaster, NASA allowed the situation to get out of hand. Furthermore, Deal argues that **NASA must address their “managerial and organizational issues or it would not be effective in future accidents”**. This memo will provide analysis of the Columbia Shuttle disaster, answering the following questions: *Why did NASA downplay the threat of foam?* and *Where does accountability and responsibility for the accident lay?* Furthermore, I will provide **recommendations** based on my analysis of the case. I feel as though my role as an outside contractor gives me the opportunity to examine this disaster with a more objective view than someone within the organization.

**Why did NASA downplay the threat of foam?**

Throughout the first seven days of the Columbia Shuttle disaster NASA continued to downplay, almost ignore the threat that the foam debris would have on the shuttle. This was the outcome of a variety of reasons including the history of its previous flights and the external pressures on the organization.

## **History of NASA**

In understanding the reason that NASA downplayed the threat of the foam debris a brief understanding of the history of events that have taken place within NASA for the past forty years. Though there have been many achievements in the variety of flight programs, there have also been tragedies or near tragedies beginning in 1967 with an explosion of flight gasses that left three people dead. In 1970, though Apollo 13 astronauts did survive the loss of power and air, NASA was able to save the lives of the men. 1986 though was a different story; the Challenger Shuttle exploded 73 seconds after take off, resulting in the loss of life of 7 people. The risk of loss of human life plays a key role in the culture of NASA and the way in which it operates. NASA performs risks that other organizations may not. They attempt to go places that we as human beings have not in the past and therefore there is a risk that these launches, experiments, and a risk of loss of human life.

Loss of life in past shuttle launches, such as the Challenger, led to drastic changes in NASA budgets and public perceptions. Both of this affected the productivity of the extent of experiments and advances that the organization could make. NASA as an organization did not want Columbia to become another Challenger. Their budget had already been cut significantly in the past 20 years. NASA has to be able to determine what may be a problem with a flight and what a problem with the flight is. There is going to be some risk with each flight and turning each problem into a larger issue could be a risk that NASA did not want to take.

The history of the shuttle flights provided a way in which Ham and others could downplay this threat. By classifying the debris as a “maintenance issue” which foam strikes in the past have been categorized as they were able to attempt to make the issue nothing more than a normal occurrence that did not have significance to the current issue. By ignoring the problem

and not wanting to accept the larger risk because of the implications that disasters in the past had on the organization it appears as though this was a decision that needed to be made in order to protect the future of the organization.

### **External pressures**

Because of the history of NASA's shuttle program and the funding associated with the program, there were many external pressures resting on the success of this flight. First, NASA had committed to 5 shuttle missions in 2003. They needed to be accountable to the public and stick to all 5 of these missions because NASA has historically not been able to complete as many missions as it was first believed would be possible. At first it was believed that they would be able to complete 60 missions per year, this original goal in the shuttle program has never even been close when nine missions took place in one year. By making a large deal of the Columbia shuttle and taking any time to delay its return this could have delayed the rest of the schedule for NASA. This pressure of remaining on schedule became a clear pressure on the organization and the decisions that took place regarding the foam debris. Congress and the public expected accountability in the program and wanted to see results. This pressure, though important to NASA's decision, has also become a major theme in all agencies in both the public and nonprofit sector. We want to see where our investments are going and furthermore, expect to see the desired results.

*Where does accountability and responsibility for the accident lay?*

In examining where the accountability and responsibility for the accident lay we must thoroughly examine the communication styles and culture of the organization. By examining these factors it becomes evident that this accident was not the fault of one person, but the faults

of an entire organization. There are many instances in which specific individuals, including myself could have done something different, but individuals become limited in their abilities due to the larger issues surrounding the disaster. We must not examine specific actions of the shuttle disaster, but larger themes that all involved shared.

### **Communication**

Within NASA there was a very unique way of communication. Their organizational communication follows a top down model, meaning that communication comes from the top of the organization and works its way down to the other levels. Bowman and Buono (2005) discuss the three functions of communication in analyzing situations, being production and regulation, innovation, and socialization and maintenance. Each of these functions of communication is important in managing within organizations.

NASA, even prior to the Columbia shuttle disaster had very poor organizational communication. One of the reasons for this was the way in which knowledge was shared or managed. Torarie Durden, an engineer discussed the difficult in communicating not only among one's peers in NASA but also in communicating with supervisors and managers. Durden discusses frustration over the different levels of engineers and managers and the problems in trying to communicate one's ideas because of the "institutional bureaucracy" of the organization.

Furthermore, managers also had difficulty in sharing and relaying information to their supervisors. These communication barriers caused numerous problems in regards to the shuttle disaster, first and foremost being, engineers who believed the extent of the foam problem was not an anomaly, but a serious problem. Engineers did not have the opportunity to communicate their ideas at the Mission Management Team, nor did myself as a contractor and co-chair of the

Debris Assessment Team that was formed after a first initial review of videos of the foam debris. Even through the seventh day of the flight, I was not given the opportunity to communicate my feelings about the debris and the impact that it may or may not have had on the shuttle directly in a MMT meeting. Though within the organization it was believed that contractors often knew more about these kinds of problems, yet there was know communication with those who had been contracted out.

### **Culture of the Organization**

Culture within an organization can be defined in a variety of ways, from “the way we do things around here” to the shared patterns that a group learns as it solves problems and works together” (Bowman and Deal, 2003). Throughout time organizations develop their own specific values and beliefs. NASA has a unique culture, based on a history of risks and exploration, a combination of science and management, and a changing relationship within the public’s eyes. Because of these reasons the culture of NASA has led itself into being a culture that makes the decision making process difficult. To some this culture is fearful and insufficient. The culture does not listen to all involved within the process, and their have become so many different levels that making needed changes becomes difficult. Another important aspect of the culture is the changing dynamics due to contracting so much of the work out to private companies.

A contributing factor of the shuttle disaster was that engineers concerns were not taken seriously. This is not only due to communication difficulties, but also exemplifies a culture that made it difficult for people to express their concerns and ideas. Engineers became fearful of making a larger deal about a situation, not only because they lacked in data regarding this issue, but it was apparent that their opinions did not matter as much as they should. With the

contracting out of much of the engineering and building of the shuttles, NASA engineers were doing more desk work and less of what they had knowledge and experience of. NASA's culture of taking risks, relying on past missions as evidence, and removing the voice of the engineers all became significant reasons as to why no evident plan took place regarding the days before the Columbia Shuttle disintegrated.

## **Recommendations**

I agree with Deal regarding NASA and the Columbia Shuttle disaster, there must be large changes within the management and organization to ensure that they can do their best to prevent incidents like this in the future.

### *1. Assess the current shuttle program's ability to conduct flights*

By hiring an outside group to conduct a study on how realistic it is to complete 5 shuttle launches per year. This will allow NASA to become accountable because it will establish a realistic timeline that they can follow regarding their shuttle launches. By doing this it will also relieve some of the pressure that the organization may feel when making decisions that are based on time and money. Though this may not lead to an increase in funding for the shuttle program, I believe that it will lead to an increase in realistic feasibility. NASA must be willing to reexamine its current abilities in launching safe shuttle missions and its ability to assist in returns.

### *2. Establish new means of communication strategies within the organization.*

Communication within the culture of the organization continues to be a problem in the effectiveness of the organization. NASA must be willing to change their knowledge management and sharing practices. The formal networks of communication need to be

rearranged to give a voice to everyone involved. This could happen by allowing everyone at the “table” to share their ideas and input to flattening the hierarchy of communication. One very important change in communication is giving engineers more of a voice. Managers must not be the one’s responsible for sharing scientific knowledge.

*3. Contractors must be given a larger role within the organization*

NASA will continue to contract out to other companies. Thus, if the belief contractors know the answers, they must be given the opportunity to share their ideas. It would be important to give these contractors physical space within NASA, as well as some kind of organizational power throughout the decision making process as well. Contractors need to remain accountable and responsible to NASA but can not do this unless they have clear access to organization and to the process.

Thank you for your time regarding this matter. Please contact me with any further questions and I look forward to discussing these recommendations further.