
COLUMBIA SHUTTLE STS-107

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FROM: LINDA HAMM
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Summary

Upon reflection on the Columbia Shuttle disaster it is clear to me this tragedy is not the fault of any one person. It is a result of the institution NASA has become. In many ways, this accident was preventable and in an effort to ensure such tragedies are not repeated, NASA needs to address key organizational issues. The structure, culture, and leadership of NASA all played a role in this accident. Addressing these issues within the organization will bring about needed change and improvements. This memo will provide a detailed analysis of these issues along with recommendations that can bring about organizational change at NASA and make certain mistakes of the past do not occur again.

Structure

The overall structure of NASA is extremely hierarchical and highly centralized. In my previous position as flight director I worked in a hierarchical structure with highly centralized decision making and reporting. This structure works well for simple and well-understood task environments. Yet in my new position as Program Integration Manager responsible for Columbia's flight, the structure is highly decentralized but was managed in a centralized manner, as I was accustomed. A hierarchical structure, emphasizing top down control does not work well

in complex task environments where lateral forms of communication and coordination are important (Bolman & Deal, 2003). This structure resulted in a top down distribution of information and decision making that stifles the flow of information. Critical safety concerns raised by the Debris Assessment Team (DAT) were never brought to my attention and seasoned NASA engineers found it difficult to penetrate the hierarchical structure in order to voice their concerns. The DAT did not report directly to Mission Management Team (MMT) and instead reported indirectly through the MER Manager, Don McCormack, resulting in incorrect communication of critical safety of flight concerns.

To remedy the issues associated with NASA's current structure, a simple solution can be implemented. NASA management can form Quality Circles where representative from each team come together to share issues and problems, find ways for making improvements, and collectively make decisions (Morgan, 2006). Theory suggests that this process "creates an enormous degree of shared understanding of issues and problems" (Morgan, 2006). Quality Circles work very well in environments where problem solving, innovation, and robustness of decisions and actions are critical such as the environment at NASA. There is a large amount of redundancy that occurs in Quality Circles. However, the sharing of information can be a source of creativity, shared understanding, trust, and commitment, all organizational elements that NASA needs at this time.

Culture

Through the implementation of Quality Circles, NASA can address structural issues yet problems still exists within NASA's culture. Currently, a culture of fear exists at NASA. This culture is preventing effective communication of critical safety information and making it increasingly difficult for concerned engineers to be heard by those with decision-making power.

I believe a large factor contributing to a culture of fear at NASA is preoccupation with a desire to be “winners”. From its conception, NASA has been competing in a “space race”. An obsession with winning the game is made worse by political pressure from Washington. Sticking to schedule, meeting mission deadlines, and a successful launch are valued in NASA’s culture while delays, alterations, and conflicting views are kept quiet. Such conflicting views on shuttle mission management may have saved Columbia.

Similarly, the culture of “group think” that exists at NASA is also preventing people from raising a conflicting view. The term group think was coined by Irving Janis to describe situations and environments where people try to minimize conflict without critically testing, analyzing, and evaluating ideas. A sense of assumed consensus occurs in many of NASA’s teams. I experienced this first hand on the MMT meeting calls when I would interpret silence as consonance. Shared illusion and operating norms interfered with people’s ability to think critically and express their doubts. Gareth Morgan, an organizational theorist, points out that there is great merit in recognizing the “prison like qualities of culture”, “culture gives us our world and it traps us in that world!” (2006).

Changing an organizations culture is not an easy task, especially at NASA where our culture is our mission and our beliefs. Yet it is necessary to avoid repeating the mistakes of our past. NASA’s culture needs to transition from valuing meeting deadlines and sticking to schedule in favor of a culture that promotes sharing ideas, openly discussing problems, questioning assumed consensus, and raising a conscious awareness (Morgan, 2006). I recommend NASA work to change its current culture. To help create cultural change and overcome some common barriers associated with change, organizational theorists Bolman and Deal offer some practical strategies:

- Training to develop new skills; participation and involvement
- Communicating, realigning, and renegotiating formal patterns and policies
- Create arenas where issues can be negotiated and coalitions can form
- Create transition rituals, let go of the past, celebrate the future

These recommendations, implemented over time, can result in a new culture of openness, idea sharing, and valuing participation from all levels of the organization. Changing the culture of NASA will help prevent further breakdowns in communication and create a shared system of values that is internalized by every member and acted on at every level (Morgan, 2006).

Leadership

Leadership is often presupposed as the answer to all organization problems. Most managers at any organization in the world would say their organization would thrive if there were more displays of “real leadership” (Bolman & Deal, 2003). Although leadership is commonly a misdiagnosis of organizational ills, with such high stakes and people’s lives on the line, the digression of leadership at NASA is a problem that must be addressed.

Managers and supervisors mistake authority and management as leadership. Yet authority falls outside the realm of leadership and one may be a leader without being a manager, or a manager without being a leader (Bolman & Deal, 2003). Leadership problems are also exacerbated by NASA’s structure, which imposes project teams onto a strong bureaucracy. In this structure, both department heads and team representatives perceive themselves as leaders, creating dual loyalties amongst staff (Morgan, 2006). This is a problem in an organization such as NASA where high stakes exist, pressure to keep to deadlines is immense, and people’s lives are at risk. NASA needs clearly defined leadership that prioritizes safety of the crew and encourages an open system of communication.

Bolman and Deal concede there is much disagreement and confusion on how to create or change leadership (2003). A series of studies on leadership have shown there is no one-best-way to lead. In an effort to provide a recommendation that is practical and also goes beyond an oversimplified view of leadership, I will borrow on Bolman and Deal's Reframing Leadership model that examines skills and processes while suggesting rules of thumb for successful leadership practice:

Leadership is Effective When:			Leadership is Ineffective When:	
Frame	Leader is:	Leadership Process Is:	Leader Is:	Leadership Process is:
Structural	Analyst, architect	Analysis, design	Petty tyrant	Management by detail
Human resource	Catalyst, servant	Support, empowerment	Weakling, pushover	Abdication
Political	Advocate, negotiator	Advocacy, coalition building	Con artist, thug	Manipulation, fraud
Symbolic	Prophet, poet	Inspiration, framing experience	Fanatic, fool	Mirage, smoke, & mirrors

Leadership developed throughout NASA will help members move beyond this tragedy by reconnecting people to organization mission and vision, a necessity for NASA at this juncture.

Conclusion

Fixing something requires knowing what is broken. The structure, culture, and leadership of NASA are broken and must change. As a top manager, I too am a product of the organization structural, cultural, and leadership weaknesses. The actors may change, however if the problems are not addressed, the system will stay the same. These recommendations will take time and enormous effort. However, they provide NASA an opportunity to learn from mistakes, fix what is broken, and transform into an organization we are proud to be part of.

References

Bolman, Lee G. and Terrence E. Deal. 2003. *Reframing Organizations: Artistry, Choice, and Leadership*, 3rd Ed. San Francisco: Jossey-Bass.

Morgan, G., *Images of Organizations*. Thousand Oaks: Sage Publications, Inc. 2006.