National Aeronautics and Space Administration

Lessons from the Challenger Launch Decision
Additional Resources

NASA Resources

- Report of the Presidential Commission on the Space Shuttle Challenger Accident. 1986.
  URL: http://history.nasa.gov/rogersrep/genindex.htm
- NASA History Program Office – Challenger STS 51-L Accident (Multiple links to relevant resources on NASA and Non-NASA sites)
  URL: http://history.nasa.gov/sts51l.html

Other Challenger Case Studies

- The Space Shuttle Challenger Disaster: A Study in Organizational Ethics (7 pages)
  URL:
  http://pirate.shu.edu/~mckenndo/pdfs/The%20Space%20Shuttle%20Challenger%20Disaster.pdf
- The Final Voyage of the Challenger, by Oscar Hauptman & George Iwaki. Harvard Business School. November 1990.
  URL: http://hbr.org/product/final-voyage-of-the-challenger/an/691037-PDF-ENG

Papers & Articles

Arnold, Vanessa D., Mailey, John C. 1988. "Communication: the Missing Link in the Challenger Disaster." *Business Communication Quarterly* 51(4):12-14.

Boisjoly, Russell P., Curtis, Ellen Foster, and Mellican, Eugene. 1989. "Roger Boisjoly and the Challenger Disaster: The Ethical Dimensions." *Journal of Business Ethics* 8(4):217-230.

Abstract: This case study focuses on Roger Boisjoly's attempt to prevent the launch of the Challenger and subsequent quest to set the record straight despite negative consequences. Boisjoly's experiences before and after the Challenger disaster raise numerous ethical issues that are integral to any explanation of the disaster and applicable to other management situations. Underlying all these issues, however, is the problematic relationship between individual and organizational responsibility. In analyzing this fundamental issue, this paper has two objectives: first, to demonstrate the extent to which the ethical ambiguity that permeates the relationship between individual and organizational responsibility contributed to the Challenger disaster; second, to reclaim the meaning and importance of individual responsibility within the diluting context of large organizations.

Browning, Larry D. 1988. "Interpreting the Challenger Disaster: Communication under Conditions of Risk and Liability." *Organization Environment* 2(3):211-227.

Abstract: This research is a case study of the events following the Challenger accident and focuses on the way in which members of NASA before the accident and the Presidential Commission following the accident acted in ways to protect the survival of NASA as a viable agency. The central theme of the strategies of protection was to localize the blame to individuals at lower levels in NASA and to fix blame on a communications failure (a technical problem) rather than blaming the leadership of NASA (an institutional problem). In its conclusion the article addresses the issues involved in crossing entrepreneurial cultures that include risk and high technology with bureaucratic cultures that are safe and procedural.

Dombrowski, Paul. 1991. "The Lessons of the Challenger Investigations." *IEEE Transactions on Professional Communication* 34 (4):211-216.

Abstract: Both in methodology and in findings, the investigations of the Challenger disaster, one by a Presidential Commission and one by a Congressional committee, demonstrate that even in highly technical matters, meaning is socially constructed. Drawing on the many recent critiques of the supposed impersonality of technical communication, the author examines the evidence and testimony before the investigating bodies and finds that before the launch, NASA officials construed information about O-ring charring in socially contingent ways and ultimately pressed engineers to work under similar assumptions in declaring the shuttle flightworthy. Further, although the two investigations examined much the same evidence, differing methodological assumptions led them to different conclusions and recommendations. Dombrowski finds that both investigations emphasized procedural

concerns while largely neglecting personal judgment and responsibility, even though the evidence suggests a key role for personal and social judgment. He concludes that the field of professional communication needs to become more alert to the role of social factors in technical matters.

Dombrowski, Paul. 1992. "Challenger and the Social Contingency of Meaning: Two Lessons for the Technical Communication Classroom." *Technical Communication Quarterly* 1(3):73-86.

Abstract: In my technical writing class, I examine two "meanings" from the Challenger disaster to illustrate the social contingency of meaning even in science and technology. These instances are the "anomalous" charring of the O-rings and the reconceptualized assumption of flightworthiness the night before the launch. The social contingency of these meanings shows that the "object" of technical communication is not the material object as a pre-existent isolate but in its social interpretation, significance and meaning. Ultimately, technical communication is about people communicating about and to the interests of other people.

Driskill, Linda. 1989. "Understanding the Writing Context in Organizations." In Writing in the Business Profession. (125-145).

Gouran, Dennis S., Hirokawa, Randy Y, and Martz, Amy E. 1986. "A Critical Analysis of Factors Related to Decisional Processes Involved in the Challenger Disaster." *Communication Studies* 37(3):118-135.

Abstract: Although the Rogers Commission identified flawed decision-making as a contributing cause to the accident of the Challenger, the characterization is too general to explain the particular way in which the decision formed. Five factors that, in combination, appear to account for the mind-set in which the decision to launch was made are examined. These influences include (1) perceived pressure, (2) rigid conformity to perceived role requirements, (3) questionable reasoning, (4) ambiguous use of language, and (5) failure to ask important relevant questions.

Gouran, Dennis S. 1995. "The Failure of Argument in Decisions Leading to the "Challenger Disaster": A Two-Level Analysis." In *Warranting Assent: Case Studies in Argument Evaluation*, edited by Edward Schiappa.

Moore, Patrick. 1992. "When Politeness is Fatal: Technical Communication and the Challenger Accident." *Journal of Business and Technical Communication* 6 (3):269-292. [**Note**: This paper addresses an aspect of the Challenger accident's history not addressed in the case study.]

Abstract: Severe icing on the space shuttle Challenger's launch pad should have halted the launch on the morning of January 28, 1986. One Rockwell International manager told his subordinates to be sure NASA knew that Rockwell thought a launch was not safe. When the

Rockwell subordinates spoke directly to NASA managers, however, they used politeness strategies to blur the directness of the Rockwell manager's message. The NASA managers interpreted the politeness of the Rockwell subordinates as meaning it was safe to launch. The Rockwell subordinates did not mean it that way, but the Challenger was launched.

Moore, Patrick. 1992. "Intimidation and Communication: A Case Study of the Challenger Accident." *Journal of Business and Technical Communication* 6(4):403-437.

Abstract: At the urging of managers from NASA's Marshall Space Flight Center on the night before the fatal launch of the Challenger, the managers at Thiokol reconsidered their judgment not to launch the next day. Although there were no new data, and although their engineers still objected, the Thiokol managers took off their "engineering hats" and put on their "management hats" and decided to launch anyway. The urging of Marshall management and pressure from other sources intimidated Thiokol management and at least one Marshall engineer to do what their superiors wanted them to do. Four conditions created the intimidation: (a) a fear of retaliation, (b) a lack of justice, (c) Marshall's tradition of discouraging the reporting of bad news, and (d) an objectionable act, that is, overruling the engineers on a life or death technical decision.

Pace, Roger C. 1988. "Technical Communication, Group Differentiation, and the Decision to Launch the Space Shuttle Challenger." *Journal of Technical Writing and Communication*. 18(3):207-220.

Abstract: One lesson to be learned from the fatal decision to launch Challenger is that effective technical and group communication requires more than the fidelious exchange of information. This article examines testimony gathered by the Presidential Commission on the Challenger Accident and reveals communication failures in four dimensions of group differentiation – clarity, interrelatedness, centrality, and openness. The article illustrates all four dimensions with excerpts from the Commission Hearings and identifies communication problems peculiar to highly technical groups.

Pinch, Trevor J. 1991. "How Do We Treat Technical Uncertainty in Systems Failure? The Case of the Space Shuttle Challenger." In *Social Responses to Large Technical Systems*, 143-158. T.R. La Porte (ed.). Kluwer Academic Publishers.

Vaughan, Diane. 1997. "The Trickle-Down Effect: Policy Decisions, Risky Work, and the *Challenger* Tragedy." *California Management Review* 39 (2).

Abstract: The Challenger disaster cannot be accounted for by reductionist explanations that direct attention only toward individual actors, nor by theories that focus solely on communication failure or the social psychological dynamics of the infamous eve-of-launch teleconference. The cause of the tragedy was rooted in historic organizational and environmental contingencies that preceded the launch decision. By tracing the connection between top policy decisions and decisions by engineers and managers assigned to do risky

work, this analysis contradicts conventional understandings about what happened at NASA. As a consequence, this case contains new lessons for both managers and students of organizations.

Winsor, Dorothy. 1988. "Communication Failures Contributing to the Challenger Accident: An Example of Technical Communicators." *IEEE Transactions on Professional Communication* 31 (3): 101-107.

Abstract: Examination of the public documents available on the Challenger explosion shows that a history of miscommunication contributed to the accident. This miscommunication was caused by several factors, including managers and engineers interpreting data from different perspectives and the difficulty of believing and then sending had news, especially to superiors or outsiders. An understanding of the dynamics at work in the Challenger case can help engineers and engineering managers elsewhere reduce miscommunication in their own companies.

Winsor, Dorothy. 1990. "The Construction of Knowledge in Organizations: Asking the Right Questions about the Challenger." *Journal of Business and Technical Communication* 4(2):7-20.

Abstract: Previous research on the communication failures contributing to the Challenger's explosion tends to ask why it happened that various people in the organizations involved knew about the faulty O-rings but failed to pass on the information to decision makers. This is a faulty question, revealing assumptions many of us unconsciously share even when we consciously reject these assumptions. This question implies a simplistic notion of knowledge and a conduit model of communication. Insights from the sociology of technology and the new rhetoricians can help us to form better questions about rhetoric in organizations.

Books

Mahler, Julianne G. 2009. *Organizational Learning at NASA: The Challenger & Columbia Accidents*. Georgetown University Press.

Vaughan, Diane. 1996. *The Challenger Launch Decision: Risky Technology, Culture and Deviance at NASA*. University of Chicago Press.