Boeing 737 MAX: A Case Study in Communication Management Failure

Riya Patel

Information Systems, Northeastern University

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Professor Shirali Patel

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The Boeing 737 MAX project represented an effort to update Boeing's long-running 737 series with new, fuel efficient LEAP-1B engines and a flight-control software package to achieve performance parity with the competing A320neo product from Airbus. The project range included hardware re-design, new software design-in, and global certification. The stakeholder list included, but was not limited to, Boeing executives, engineering and safety teams, the Federal Aviation Administration (FAA), airlines, pilots, and the flying public. The anticipated benefits included improved fuel economy, achieving lower operating costs, and improved competitiveness in the marketplace. Unfortunately, two aircraft accidents (Lion Air JT610 in 2018 and Ethiopian Airlines ET302 in 2019) led to nearly 350 lives lost and grounding of the global fleet. In making its assessment about the accidents, the investigators found that deficiencies in communication management, internal and external, played a pivotal role in the failure (Herkert et al., 2020).

Intended Benefits and Technical Challenges

MCAS (Maneuvering Characteristics Augmentation System) was designed to compensate for the aerodynamic instability that larger engines set higher and more to the forward point on the airframe created. Although MCAS was designed in a way that would automatically prevent stalls, Boeing did not inform pilots of the existence of MCAS until after the first crash. The decision not to inform pilots of MCAS existed to market the MAX as requiring very little retraining of pilots which preserves the cost-benefit analysis at the expense of safety (Herkert et al., 2020).

Evaluation of Communication Management

Throughout the course of the program, communication practices were inconsistent and

opaque. Internally, engineers raised warnings regarding the MCAS design and reliance on a single sensor, but neither the department nor engineers escalated or acted on their warnings. The test pilot's email characterized MCAS as “running rampant,” but management failed to act. Externally, Boeing appeared to communicate only limited information to the FAA, which delegated the majority of the certification to Boeing, contributing to a breakdown in regulatory communication and oversight (Herkert et al., 2020). The FAA’s own risk assessment anticipated up to 15 future crashes if the issues were not addressed and the report was not disclosed until Congressional inquiry a year later (Herkert et al., 2020). These failures in communication demonstrate a culture that prioritized schedule and profit over safety and transparency. All personnel at Boeing and the FAA operated under a “problem of many hands” where responsibility for oversight was diffused and no one person ensured the flow of relevant information for the full picture (Herkert et al., 2020). The communication of a complex project should have involved formalized feedback loops, structured stakeholder alignment meetings and a formal risk escalation process during the design and certification phases. Several major communication failures were identified during the 737 MAX project (refer Table 1).

Table 1

Key Communication Failures and Their Impacts

Communication Failure	Safety	Regulatory	Public Trust	Financial
MCAS not disclosed earlier to pilots	✓		✓	
Insufficient escalation of internal engineer warnings	✓			
Insufficient transparency to FAA during certification		✓	✓	
Limited crisis updates following the initial crash			✓	✓

Implications of Communication Failures

The consequences of the communication failures were significant. There were safety failures that resulted in loss of life, and the grounding of the fleet throughout the world. Boeing's reputation as an engineering organization declined, with financial impacts over $18 billion (Herkert et al., 2020). Public confidence declined, specifically confidence in aviation safety, and regulatory oversight was also lack confidence specifically in the FAA international level was criticized for “grossly insufficient” oversight. From a project management perspective, these failures illustrate the substantial impact that communication management is a vital link with risk control to stakeholder confidence. If there had been accurate reporting and active listening across the hierarchies and between agencies, the alerts of the issues would have been conveyed and mitigated each time.

Alternative Communication Strategies

Boeing could have prevented these failures by pursuing effective and thoughtful communication management plans that followed PMBOK guidance in the following ways:

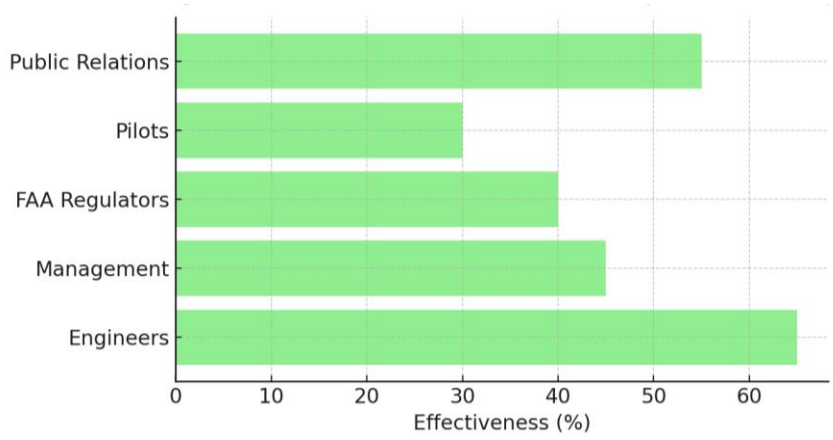
1. Transparency and stakeholder buy-in - Share design changes and limitations of the system with pilots, airlines, and regulators, early and continually.
2. Formal risk reporting - Set up a formal channel for engineers to have safety concerns raised independently of management to the executive and regulatory boards.
3. Crisis communication strategy - Memorize clear processes for how information will be publicly communicated as well as technical statements after a crisis occurs to help regain trust.
4. Independent verification and validation - Have an external party to review the communication process that validates all documentation for certification and pilots manuals.

If Boeing would have acted on these recommendations their project would have possessed more

transparency and the ethical and technical accountability would have remained consistent throughout the project. The findings in Figure 1 suggest that communication effectiveness between the engagement was extremely variable between the range of stakeholder groups, thus representing an important opportunity for more balanced and transparent stakeholder engagement going forward.

Figure 1

Perceived Communication Effectiveness by Stakeholder Group



Recommendations for future projects

1. Facilitate clear communication - Institute channels that , engineers, managers, and regulators can use to communicate about safety issues in a traceable manner (Herkert et al., 2020).

2. Regularly glue together stakeholders - Schedule recurring cross-functional reviews to identify risks and make decisions earlier (Herkert et al., 2020).

3. Protect whistleblower protections - Create routes for confidential reporting to maintain that safety issues are not hidden or suppressed (Herkert et al., 2020).

4. Plan for crises ahead of time - Utilize pre-approved protocols for speed and accuracy in reporting to regulators, pilots, airlines, and citizens (Gelles & Kaplan, 2019; Herkert et al., 2020).

5. Measure communication quality - Track clarity, timeliness, and completeness for all communications as part of your project health assessment (Herkert et al., 2020).

These are steps which institutionalize the central lesson from the MAX fiasco, which is that effective and transparent communication is necessary to maintain safety and stakeholder trust (Herkert et al., 2020).

Conclusion

The 737 MAX situation illustrates how poor communication can destroy a technically ambitious project. Lack of clarity in information, restricted information sharing with regulators and pilots, and an insufficient escalation of engineering issues, all contributed to significant safety, reputational, and financial consequences (Herkert et al., 2020). Delegated Certification and incomplete transparency only drove regulatory scrutiny (Gelles & Kaplan, 2019; Herkert et al., 2020). A project will ultimately succeed or fail based on good ethical and timely communication as much as a well engineered product (Herkert et al., 2020).

References

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