

ENGN1211: Discovering Engineering

Essay

Topic 1: Communicating Risk: *Airframe*

Joseph Curtis: 3952239

Whilst engineering can achieve many great things, one must not blindly put faith in engineering and engineers. We think that science and engineering technology is omnipotent and elevate it to a position of almost perfection knowing that whatever ails us can be cured through scientific methods and technological breakthroughs. We think that engineers have the solution to all their problems. Even though in the future these beliefs may be true, with all advances there comes risk.

If it were not for those who were willing to take risks, all the amazing technologies that we see today would not exist, for to advance, you must explore where no one has previously been and you never know what will be there. With all our knowledge and power, humans can never be in complete control – there will always be risk, in whatever we do.

So are engineers finding that the public has *unreasonable expectations* of engineering in terms of risk? According to Beder¹ this is because the engineers themselves have been the ones to portray technology as *predictable* and *controllable* in order to win the public's acceptance for their technologies. It is this misleading of the public that leads to such events occurring as in *Airframe*.² When this event occurred, it was soon realised that the public had certain expectations of technology and when it failed they looked to the nearest person to blame.

When flight 545 malfunctioned³, the public was angry. They looked to the obvious facts which were firstly, the aircraft malfunctioned and secondly that *Norton*⁴ made the aircraft. The conclusion was therefore, that the aircraft was flawed, the Company irresponsible, and of course, the greedy managers were to blame.

If the public was correctly informed of risks beforehand, rather than being lulled into a false sense of security by the engineers (in order to gain acceptance for their designs) would it be different? Is a compromise required, in which engineers yield some of their “power” and openly discuss the various risks of their designs instead of continuing the “vicious cycle of myth making and dis-education”?

¹ Beder, S., “Risk Assessment and Communication”, *The New Engineer*, Melbourne, McMillan, 1998, pp 284-306.

² Crichton, M., *Airframe*, Knopf, New York, 1996.

³ Ibid No. 2

⁴ Ibid No. 2

When engineers portray their designs in a superior light so they become more popular and accepted by the public, it results in the reaction of the public when something actually *does* go wrong, being magnified. When something that “inventors of technology” created goes wrong, it violates the general view of the infallibility of science in the modern world today. The public expects technologies to *reduce* risks and not increase them. When this view is amplified by engineers not properly educating the public about the true nature of the designs. (as in an event such as *Flight 545*) the public is naturally outraged and shout “How could this wonderful piece of technology that they have been told is perfectly safe, risk free, how could it ever malfunction”? After all, Marder has been telling them for years that these things are safe so now could it fail?⁵

If the public was educated about how complex these machines truly are and how difficult it is to control every single event to reduce risk, maybe they would have a greater understanding that risk cannot be avoided, and if humans try to avoid risk, there will be no progress. The human race could all sit in a cave somewhere, for fear of risk of harm, but if it did, it would never accomplish anything and life would not be worthwhile.

The contrary is also true and great risk can be perceived where there is no such risk at all. This happens when the public loses trust in the engineers. If one thing can go wrong so easily then the risk must be far greater than they expected. Would the engineers be trying so hard to play down the risks if they were acceptable? They know that as in this case, the public would go into a frenzy of wild accusations.

In *Airframe*, it was the media that magnified the situation. Because of one incident on an aeroplane, it was suddenly a “deathtrap” with “serious design flaws”⁶, all based on unfounded fear brought about by distrust between the engineers and the public. After the event with flight 545, the media and public went crazy and exhibited all the behaviour described above. This in turn caused the engineers to go into their default behaviour and instead of educating the public about the risks involved in air travel they went into defensive mode and tried to present a “neat and tidy” view of the accident to the public. Marder invents a solution, saying that there was a thrust reversal in mid-flight and in order to shift the blame from *Norton*

⁵ Ibid No. 2

⁶ Ibid No. 2

Aircraft to the manufacturer of the engines and the maintenance crew saying they inadvertently installed a counterfeit engine cowling.⁷

This description of events did not fit the evidence at all, however the engineers upheld the claims in order to sustain their image of low-risk infallibility. Of course, if the public had been educated about the correct procedures in the first place they would have known that in order to locate a problem in an extremely complex machine such as this, it would take at least a month to do a full check of all the plane's systems. Hence, the media would never have jumped onto *Norton's* throat like it did, and would have given the engineers enough time to properly evaluate the situation before demanding an answer.⁸ Having always been lead to believe that technological systems are fast and efficient and are fast and easy to repair it is only natural to believe they cannot believe how tedious and difficult the repair truly is, the press assumes that there is covering up, a scandal.

The problems with *Norton Aircraft* also arise due to the public's general ignorance of the nature of aircraft design. It would be impossible to educate everyone in the procedures for the construction of one of the most complex machines known to man, however there is never any opportunity for the company to explain it's methods. When it is operating normally, people just take it for granted and don't care *how* the plane flies from one side of the world to another, they just know it works. When the technologies *fail* the company is never given a chance to explain the processes involved. The media is only involved in now. There is a 'good side' and a 'bad side' and the aircraft failed so it must be the 'bad side'. The poor victims on the plane who were injured are the 'good people' and not to blame. Ironically, in this instance it was actually one of the poor injured victims – the pilot of the craft – who was partially to blame, along with the airlines whose cost-cutting schemes allowed poor maintenance and bad parts. However, the press is never concerned with the fact that in most cases, all parties are merely victims of heinous random circumstance. The minute chance of risk is there and because that chance is there, then it must happen sometime. When the media labelled *Norton* as the 'baddies' and relentlessly pursued them, they were in a position to loose a major customer and as a result, go bankrupt, loosing 30,000 jobs. All of this as a result of the public's ignorance of aircraft design.

⁷ Ibid No. 2

⁸ Ibid No. 2

In the end, what saved them was when Singleton made *Newsline* see the truth and become educated as to the nature of the incident and because it was no longer a situation which they could relate to (the good vs the bad) and merely circumstance and inevitable risk, they lost interest. *Newsline* never ran their story because the facts were not interesting and so the company was saved.

Through this example of *Norton Aircraft* and flight 545 it can be seen that engineers do indeed propagate the public opinion that technology is safe and risk free. Even though this is an unreasonable expectation and an exaggeration of reality, still they promote this view in order to gain popularity of their designs. When the designs do not live up to these lofty criteria, the public becomes angry and look for someone to blame. This is usually the engineer.

The process of trust and subsequent betrayal when a design fails, is detrimental to the relationship between the public and engineers in general. Eventually there will come a time when there is no trust left as in *Airframe* and the incident with flight 545. The people were frustrated that they had been lied to about the risks and felt betrayed and the media was looking for a scapegoat (*Norton*). The blame was passed internally down the chain of command in *Norton* from Edgerton to Marder to Singleton.

It is obvious that in order to avoid such dramas in the future the public must be educated about risks involved in flying. Engineers must stop propagating their own demise by continuing to lie to the public. Trust must again be built up between the engineer and the user. A trust based on truth only will serve to advance the designs and personal goals of engineers.