FAILURE ANALYSIS & PREVENTION

INVITING DISASTER READINGS

You should all have your book by now, so let’s get going on the Inviting Disaster readings! Take a look at Chapter 3 of the book, and we’ll briefly discuss it in class on Friday. To prepare for the discussion, please consider the following:

- Chapter 3 emphasizes some of the pressures that may be put on engineers, scientists, project managers, etc. by external constituencies. In the case of the Challenger and the R.101 airship, these pressures exceeded the strength of “that still, small voice” of concern, and the results were disastrous. Do you have any experience with this sort of pressure to perform? Can you imagine a situation in your future in which you might experience these pressures? Why are these external pressures so difficult to resist?

- The author highlights the tension between planning for success in projects (and the drive, optimism and promises that go along with it) and the possibilities for failure that are considered by “losers and negative thinkers.” Can you imagine yourself in the situation of being one of these losers or negative thinkers? Could you choose to shut down a project to avoid the risk of failure? Does it depend on the project and the associated risks; and if so, where is the threshold?

ASM HANDBOOK READINGS

The following ASM Handbook sections should provide some background on the failure analysis process. Most of the sections are short, so the list below looks like more reading than it actually is. If you have time, feel free to continue reading the subsequent sections that look interesting to you.

Volume 11, Failure Analysis and Prevention > Principles and Practice of Failure Analysis > The Failure Analysis Process: An Overview >

1. Introduction. This section provides a decent introduction to Failure Analysis process, and it highlights the various levels of failure.

2. Principles and Approaches in Failure Analysis Work. An enjoyable section, although most of the principles and guidelines are common sense. Preserve evidence, don’t be biased, think broadly about the problem, etc.

3. The Objectives of Failure Analysis. We touched on this topic during the classroom discussion of the failed bird feeder on the first day of class.

4. Scope and Planning. This section provides additional detail on root causes, and reminds us to broaden our perspective of failure analysis investigations. Based on our class discussion this week, I’d say that you all are doing an amazing job with thinking broadly about failure analysis. Way to go!

5. Planning and Preparation. Some ideas for failure analysis approaches and test protocols. Table 6 is a decent description of the failure analyst’s “toolbox”.

Volume 11, Failure Analysis and Prevention > Tools and Techniques in Failure Analysis > Practices in Failure Analysis >

1. Stages of a Failure Analysis. This section provides some guidance for failure investigations without making the procedures look like a cookbook recipe.

PROJECT 2 – GET ROLLING!

Spend some time planning your failure analysis investigation. By the end of class on Friday, create some kind of representation of your investigative approach. This could be graphical (e.g., fishbone diagram); a written proposal; a formal quotation that outlines your analysis; or something else entirely. For the formal quote option, please feel free to use the “squirrel-induced failure” quote template from the first day of class. My goal in this assignment is selfish: I want to get a sense of how you’re thinking about and approaching your investigation.