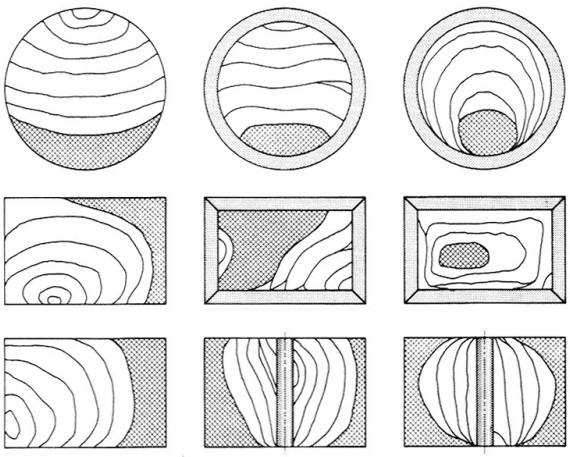

FAILURE ANALYSIS & PREVENTION

engr 3820

homework 3

ASM HANDBOOK READINGS

You're about to start the "real world" project phase of the course, so it feels like it's time for some background readings in the *ASM Handbook*. *ASM Handbook*s are available in full-text through the Olin library (a link to ASM is also provided on the Resources page of our course web site). Although *ASM Handbook* tends to be heavily focused on metals and traditional engineering applications, and at times it is too detailed for pleasant reading, it does do a decent job of presenting failure analysis methodologies. Please take a look at the following sections:

Volume 11, Failure Analysis and Prevention -> Engineering Aspects of Failure and Prevention -> Introduction to Failure Analysis and Prevention ->

1. Introduction
2. Concepts of Failure Analysis and Prevention *(NOTE: just **skim this section** for the key concepts)*
3. Root-Cause Analysis (RCA)
4. Charting Methods for RCA
5. Other Failure Analysis Tools
6. Categories of Failure

Note that the other sections under Engineering Aspects of Failure and Prevention are worth a quick look, but don't spend too much time on them.

My primary intention in assigning this reading is to inundate you with some of the terminology used in failure analysis investigations. Think of it as background knowledge building or "content coverage". Don't spend tons of time on this part of the reading.

CASE STUDY READINGS

Here's another case study for your reading pleasure. A link to the *Engineering Failure Analysis* full-text journal is available on the course web site.

- G. Piskoty, U.E. Klotz, G. Kovacs, B. Weisse, T.F. Rütti, A. Stutz, "Analysis of a tragic accident on a summer toboggan run," *Engineering Failure Analysis*, Volume 14, Issue 6, September 2007, Pages 1083-1092.

As you read and think about this case study, consider these questions:

1. What is the ratio of quantitative analysis to qualitative analysis in this study? Is this an effective balance?
2. Do the authors make effective use of graphical communication? What works well, and what could be better?
3. Are the descriptions of the fracture surfaces and microstructural features effective? How are the fracture surface and microstructure discussions integrated with other aspects of the analysis?
4. Take a close look at section 2.4. *Load capacity of the brake lever*. There are two different force analyses here – torsional and bending. Do you understand these calculations well enough to explain them to others in our class? Do you feel competent in applying this type of analysis to your own failure investigations?

SET YOUR OWN GOALS

By Monday, September 26, submit an email to me with "personal goals" as the subject line. In this email, provide the following:

1. A statement or statements of your learning goal(s) for this course, and
2. Some strategies you will use to attain these goals.

Remember that these are *your* goals, and as such could be just about anything that is connected in some way to what we're doing in this class. You will be able to modify these goals as we progress through the course, but give it your best shot now. What do you want to learn? What do you want to improve about yourself? This can be skill mastery, content mastery, process mastery, or anything else. In the past, students have set goals related to organizing technical analyses, gaining experience with particular analytical techniques, producing professional-quality deliverables,

learning about a particular topic that is important to their career aspirations, connecting Failure Analysis to their other courses, discovering personal interests and motivations, learning how to better self-assess their work, developing project management or teaming skills, etc. Again, these are *your* goals, so make them work for you.

This submission doesn't need to be too formal, but it should be clear enough for me to understand, and for you to revisit later in the semester. Give it some thought, and help me make the class work for you!