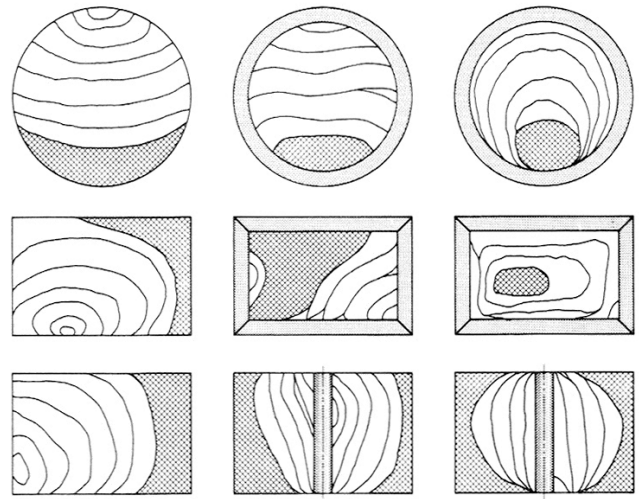




FAILURE ANALYSIS & PREVENTION

homework 1

enr 3820

READINGS

For this assignment, I'd like you to read a few failure analysis case studies that were published in *Engineering Failure Analysis*. We have full-text access to this journal through our library web site, and journal articles are downloadable in pdf format. If you have trouble finding the journal, please let me know.

Please read the following failure analysis case studies:

1. J. M. Henshaw, V. Wood, and A. C. Hall, "Failure of automobile seat belts caused by polymer degradation," *Engineering Failure Analysis* **6** (1999) 13-25. This article provides some background information that is referenced in the Dunn et al. (2005) article (below).
2. R. F. Dunn, R. H. McSwain, T. Mills, B. Malone, "Failure of plastic press release buttons in automotive seat belts," *Engineering Failure Analysis* **12** (2005) 81-98.
3. K. V. Sudhakar, "Metallurgical investigation of a failure in 316L stainless steel orthopaedic implant," *Engineering Failure Analysis* **12** (2005) 249-256. This is a brief article – just give this a quick read.

As you read and think about the case studies, consider these questions:

1. What is the main point or points of the case study...the take-home messages?
2. Who is impacted by the failure described in the case study? How are these people affected?
3. What type of physical and contextual evidence did the authors collect, analyze, and report?

4. What evidence or data are key for understanding the cause of failure? How do the authors use the evidence?
5. Did the authors present clear arguments regarding the cause of the failures? Did the authors effectively use their evidence to support their arguments?
6. Are there missing pieces, i.e., evidence, analyses, or rationale that should have been used but were not?
7. Did the authors clearly communicate their conclusions? In terms of communication, what approaches work well, and what areas need some attention?
8. Who is responsible for the seat belt failures?
9. Are there concepts, techniques, or terms in the article that you don't understand? Where might you find additional information to help you understand this stuff?
10. What knowledge, skills, and attitudes (or competencies, if you prefer) are required for successful failure analysis? Do you have the competencies required to conduct a failure analysis investigation and write a failure analysis case study? If not, what are you missing?

SET YOUR OWN GOALS

As you may already recognize, one of my goals for you in this course is that you further develop your self-directed learning skills. The project work plays a key role here, since all of the projects are highly open-ended and offer substantial student choice and control. For all of the course projects, I ask you to set team goals, identify learning strategies, manage your time and effort, etc. in ways that are related to the particular project.

Of course, a big part of self-directed learning is developing the ability to identify learning needs, interests, and opportunities, and setting personal goals that are aligned with these needs, interests, or opportunities. Self-directed learners don't rely on other people to tell them what to learn, how to learn, why to learn, when to learn, and how well they've learned. Rather, self-directed learners take ownership of the learning process, from start to finish.

This week, I would like you to take some time thinking about what you'd like to get out of this course experience, and how you'll use the high levels of autonomy in the course to develop as a self-directed learner. You'll have a couple weeks to ponder this question of personal learning goals before you set things in writing. In the meantime, please come talk to me about your goals in this course, if you like. I'll create a sign-up wiki for these course goals discussions (stay tuned for more information).

There's nothing to turn in right now, but in about two weeks I'll ask you to submit some goals and specific strategies you'll use to make progress toward the goals. For now, simply think about it and jot down some rough ideas. 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. Later in the term, you'll have the chance to revisit your goals and assess your progress throughout the semester. Give it some thought, and help me make the class work for you!
