

ENGR 3399 Mechanical and Aerospace Systems I
Fall 2010
Hands-On-Open-Ended-Project-Based-Learning Experience (*i.e.*, Assignment) #0
Due F 9/17/10 5pm

You will work with a partner on this assignment but you must write up your own work. Be prepared to discuss your results in class.

This assignment deals with the design and fabrication of an immobilization kit for drop-side cribs. To learn about these about these cribs, start by looking through:

http://babyproducts.about.com/od/sleepbedding/a/drop_side_cribs_safety.htm

One of my cribs is in AC 112. You can go there to examine the drop mechanism and to your prototypes. Note that this crib has actually been recalled for another reason.

You can learn more about the recall at these sites:

<http://www.cpsc.gov/cpscpub/prerel/prhtml10/10270.html>

<http://www.cpsc.gov/cpscpub/prerel/prhtml09/09260.html>

The objective of this project is to design and fabricate a kit that contains parts that can be attached to the crib to prevent the drop side in place and prevent any movement. Consider your kit to be the actual item that the manufacturers will send out to customers. Therefore, you'll want to design something very simple, easy to install, lightweight (to mail), and inexpensive.

You are to hand in a report which summarizes your work and addresses the items below. In addition, you'll hand in a fabricated, prototype kit.

- 1) Summarize the hazard. Why are the cribs being recalled?
- 2) Design an immobilization kit. Until you have completed your design and fabrication, do not look existing solutions that are being sent out by manufacturers.
- 3) Perform some analysis to support your design. For example, can you predict states of stress for various loading conditions? What is the max Von Mises stress expected?
- 4) Fabricate your design. You may use the rapid prototyping machines. Keep in mind you may specify a different material for your final kit. Iterate over items 3-4 as needed.
- 5) Include in your write-up a bill of materials for the complete immobilization kit. Estimate cost for parts, fabrication, and mailing.

6) Create a simple a 1-2 pages instruction sheet for installation. Keep in mind you want to make this easy and reliable.

7) After you have completed your kit, compare and contrast your kit to existing solutions (e.g., Pottery Barn Kids, Jardine).