The Canaveral Flyer

December 2006

A Newsletter of the Canaveral Section of ASME International

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Greetings Canaveral Section members,

Happy Holiday Canaveral Section Members!

Our last event provided attendees with an overview of EADS' Tanker Program. Colonel Joe Smyth USAF discussed the details of their efforts to create a top of the line refueling tanker that could accommodate both Naval and Air Force refueling efforts. Our thanks go out to Joe for providing our section the details of the EADS Tanker Program. The final RFQ is scheduled to be out in mid-December, and if all goes well the EADS team will be awarded a nice Christmas present in the form of a contract win sometime next year.

Another year is coming to an end and I am sure everyone is spending too much on Christmas already. We generally do not plan much for December because people are busy with family activities or making holiday plans. This year follows suite with those thoughts as we are offer our final presentation of the year the first Wednesday of December at the Florida Solar Energy Center.

Mark Kemper of Engineering and Mfg Services, Inc., will be demonstrating a new 3D Scanner and 3D Color Printer from Z Corp. As with our last few meetings, the evening will begin with a social at 6:00PM followed by a BBQ dinner at 6:30PM and the presentation/demonstration will begin at 7:00PM. Please see the event calendar for further details and RSVP information.

I hope to see you at this upcoming event. Have a very happy holiday season.

Sincerely,

J.D. VanGilder
Canaveral Section Chair

Schedule of Upcoming Events

Date	Event	Location	RSVP Date	Contact
Dec 6	Mark Kemper of Engineering and Mfg Services, Inc., will be demonstrating a new 3D Scanner and 3D Color Printer from Z Corp 6 PM – Social 6:30 PM – BBQ and drinks, $6/person, please RSVP 7 pm – Presentation http://www.ems-usa.com/	Florida Solar Energy Center	Dec 5	Chris Epler 321 693-3705
Jan	Annual ASME Section Awards Dinner	TBD	TBD	TBD
Feb 18 - 24	Eweek, Nominations for Tal Web Awards	TBD	TBD	TBD
Mar 14	*tentative* Phil Scarpa, Astronaut Physician at KSC	FSEC	TBD	TBD
Apr 27, 28, 29	*tentative* Space Congress – focusing on the young engineers of tomorrow	TBD	TBD	TBD

Section News

Treasure Coast S.E.A.

Kelly Mather has informed us that they do have a program this year due to an illness in one of their key people. We wish them improved health and hope that next year their program will be up and running.

What's Happening at Florida Tech:

If you have any questions about Student Section events or meetings contact J.D. VanGilder at vangilderj2@asme.org

Links to Useful Websites

ASME Canaveral Section:
http://sections.asme.org/canaveral/

Southern Field Office:
http://www.asme.org/regions/sro/

Canaveral Council of Technical Societies (CCTS):
http://www.canaveralcts.org/

Florida Solar Energy Center Located at the SW corner of Michigan Ave and Clearlake Road in Cocoa

Factors and Margins of Safety

Two of the most commonly confused terms that I have run into over the years, especially with the non-technical folks involved in our projects and businesses, are Factors of Safety and Margins of Safety. This article will discuss the two and how they typically are used to convey safety info.

Factor of safety is pretty straight forward. You have an object - lets say it is hook under load (hook attached to chain, attached to crane, holding up a heavy object). When defining a safety factor, you need to define an event it is based upon. Two options are hook permanent deformation, or hook failure. Depending on the materials involved, the load that causes these two events can be relatively close, or relatively far apart. 6061 T-6 aluminum, for example, typically has material tensile yields and tensile ultimate strengths of 38 ksi and 42 ksi, respectively. Various forms of 300 series corrosion resistant steel (CRES) can have material tensile yield and tensile ultimate strengths of 30 ksi and 90 ksi, respectively. The CRES will deform a lot more before ultimate failure than the aluminum will. Many times a factor of safety for both events is required. For non-critical ground support equipment at Kennedy Space Center, there typically is minimum safety factor requirement of 3 on ultimate and 2 on yield. Other minimum safety factors typically used in industry are 4 to 1 for the burst event on pressure vessels, and 5 or greater for lifting equipment.

Using vendor-supplied equipment usually requires some legwork. Many times catalogs will list “safe operating load”, “safe working load” or “safe operating pressure”. Discussions with the vendor will usually uncover the actual safety factors. This is important if you need to meet program or company requirements. Also, you do not want to specify oversized components because safety factors were applied by both you and the vendor.

Margin of safety is a unit-less number which defines the how much safety margin you have when considering the minimum safety factors. Lets say your company has a failure Factor of Safety requirement of 3 for all hooks you design and build. The maximum normal operating load of the hook is 100 lbs. If tests or analysis show it fails at 300 lbs, then the margin is 0. If it fails at 400 lbs, then the margin is +.03. If 600 lbs, then the margin is +1.0. Equations for load and stress (using material yield stress) cases are shown below. Adequate margins of safety are important so that parts are not rendered insufficient during use (material loss due to gouges from handling, corrosion) or during part manufacture (critical part features that are undersize of tolerance.)

$$M.S._{Failure} = Load_{at\_failure} \ / \ (Load_{in\_use} * FS_{failure}) - 1$$

$$M.S._{Yeild} = \sigma_{Yield} \ / \ (\sigma_{calculated} * FS_{Yeild}) - 1$$

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