Human Factors Related to Maintenance

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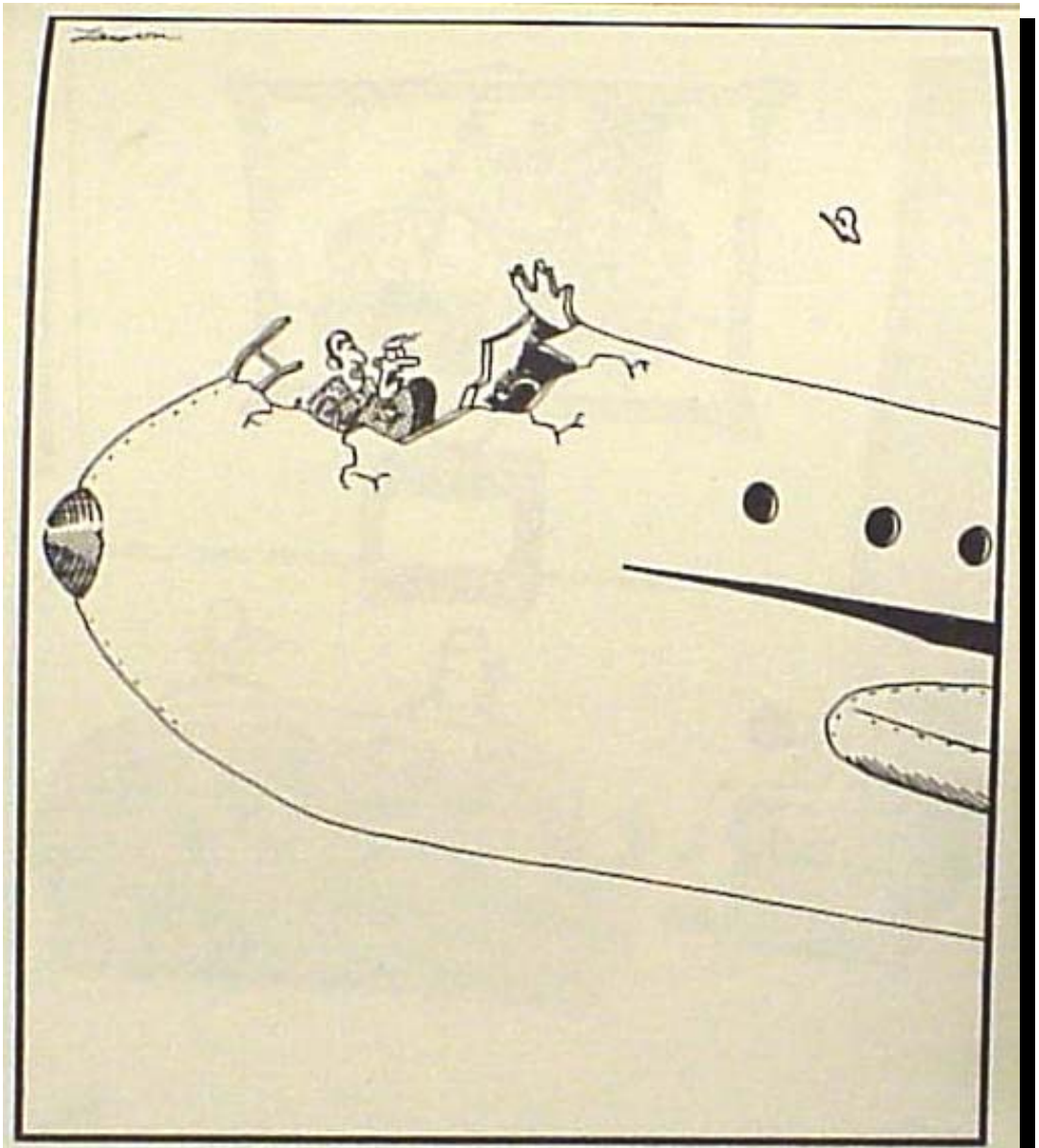
Technical Breakout Session:
Human Factors Related to Maintenance

Human factors' role in aviation safety continues to grow significantly. The Federal Aviation Administration (FAA), National Aeronautics and Space Administration (NASA), and similar government agencies abroad partnered with the airline industry over a 10-year period to conduct applied research and develop guidelines to improve maintainer productivity, maintenance quality, and flight safety. The Naval Services, recognizing the value of this work, actively sought to incorporate it into their maintenance and safety operations. This included investigating maintenance factors in mishaps; using error investigation techniques in depot overhaul and repair operations; incorporating crew resource management concepts in maintenance and flight line operations; applying human factors design principles in maintenance publication design; and proactively assessing the maintenance safety climate. This session will provide background information, implementation strategies, and lessons learned for planning similar human factors in maintenance initiatives in aviation and other maintenance arenas.



"Oh, great! Now there goes my hat!"

Maintenance Errors

Studies found that:

- **Maintenance contributed to 15% of commercial jet accidents (Boeing 1995)**
- **Maintenance problems are the 2nd greatest contributor to onboard fatalities, following CFIT (U.K.'s CAA, 1992)**

Additional Maintenance/Ramp Error Data

20-30% of engine in-flight shutdowns and 50% of engine-related flight delays/cancellations are caused by maintenance error. **(Boeing/Rankin 1997)**

48,800 unairworthy aircraft are dispatched per year as a result of maintenance error! **(Marx, 1998)**

Ramp accidents cost $2-2.5 Billion annually. **(Ramp Safety, Vol. 11:3)**

Commercial Maintenance Incident Costs

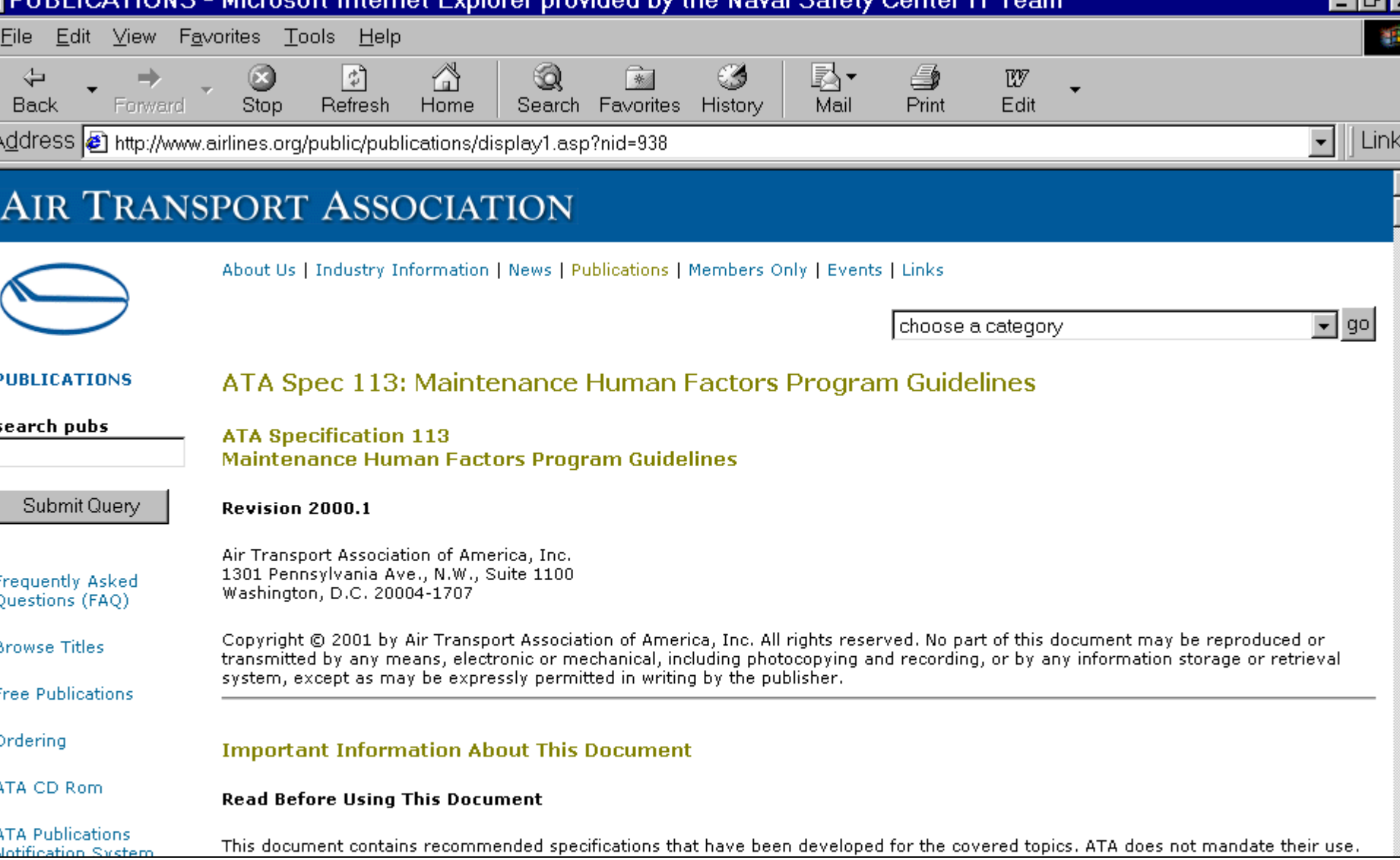
- **Ave. cost of an in-flight engine shutdown is $500,000**
- **Ave. cost of a flight cancellation is $50,000**
- **Ave. cost of a return to gate is $15,000**
- **Ave. ground damage incident costs $70,000**
- **One airline estimates $75-$100 million/year is lost**
- **Airline Transport Association estimates that ground damage costs $850 million per year.**

(Source: hfskyway.faa.gov)

Paradigm Shift: Aloha Airlines, 1988

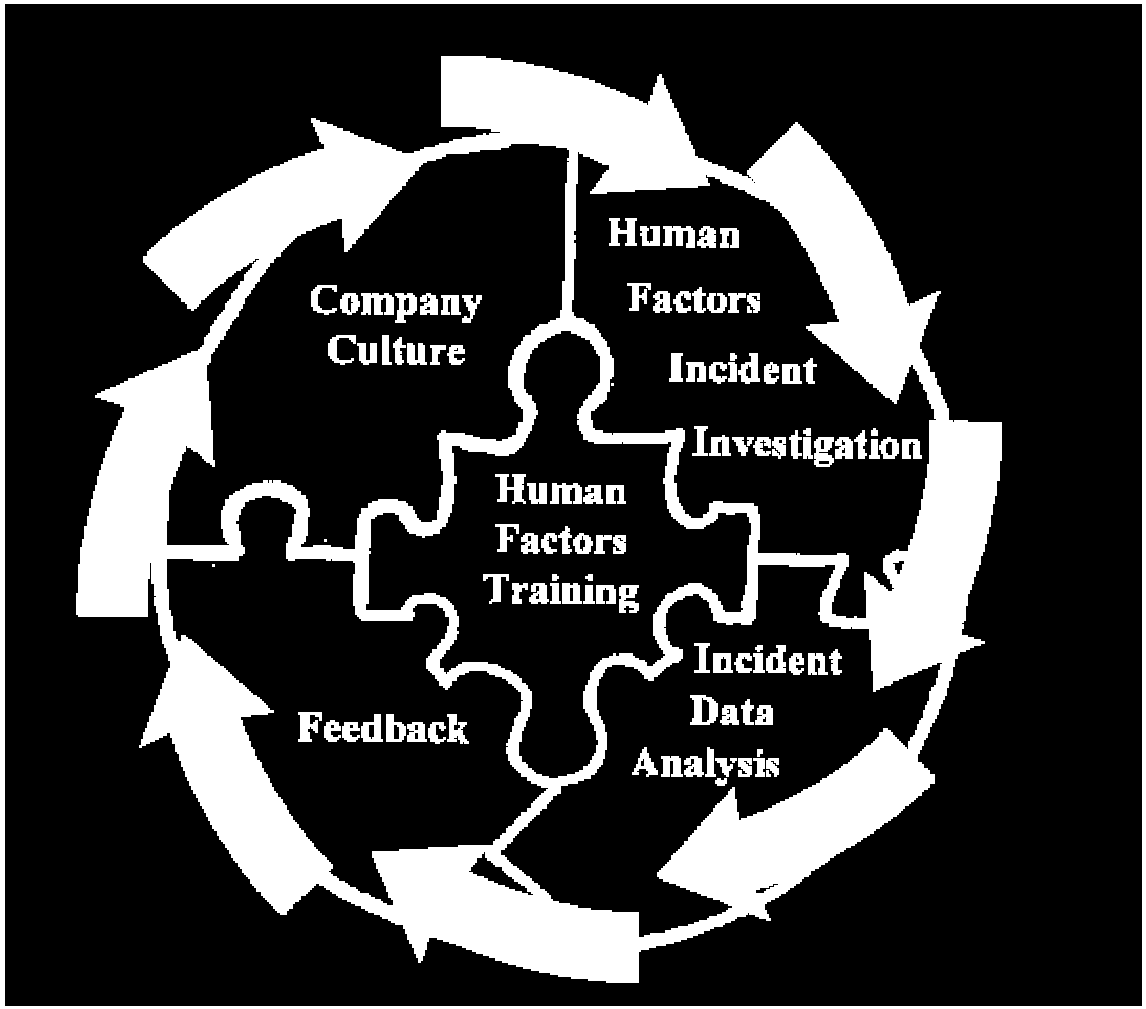
Watershed Event

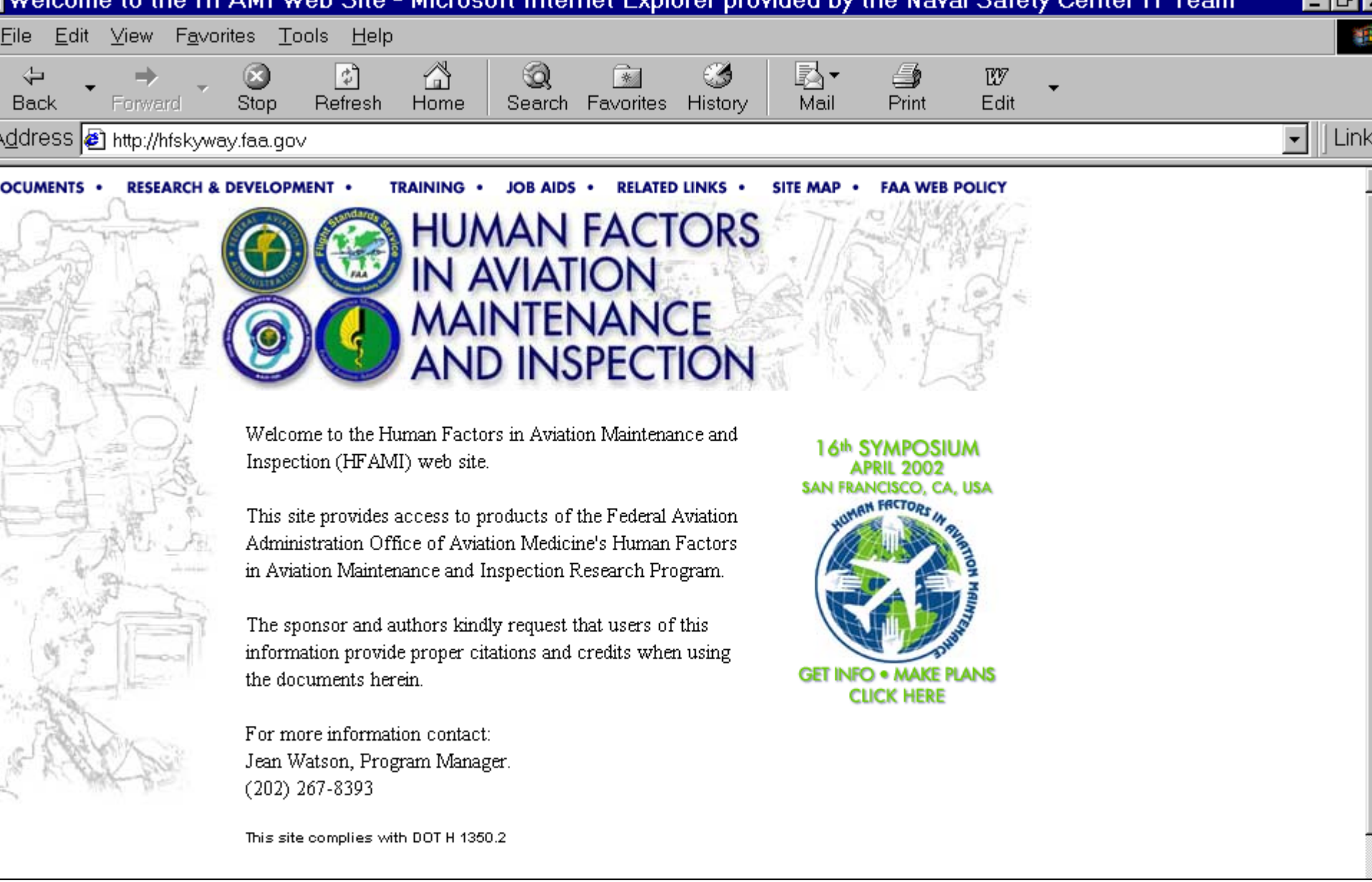
Brainstormin



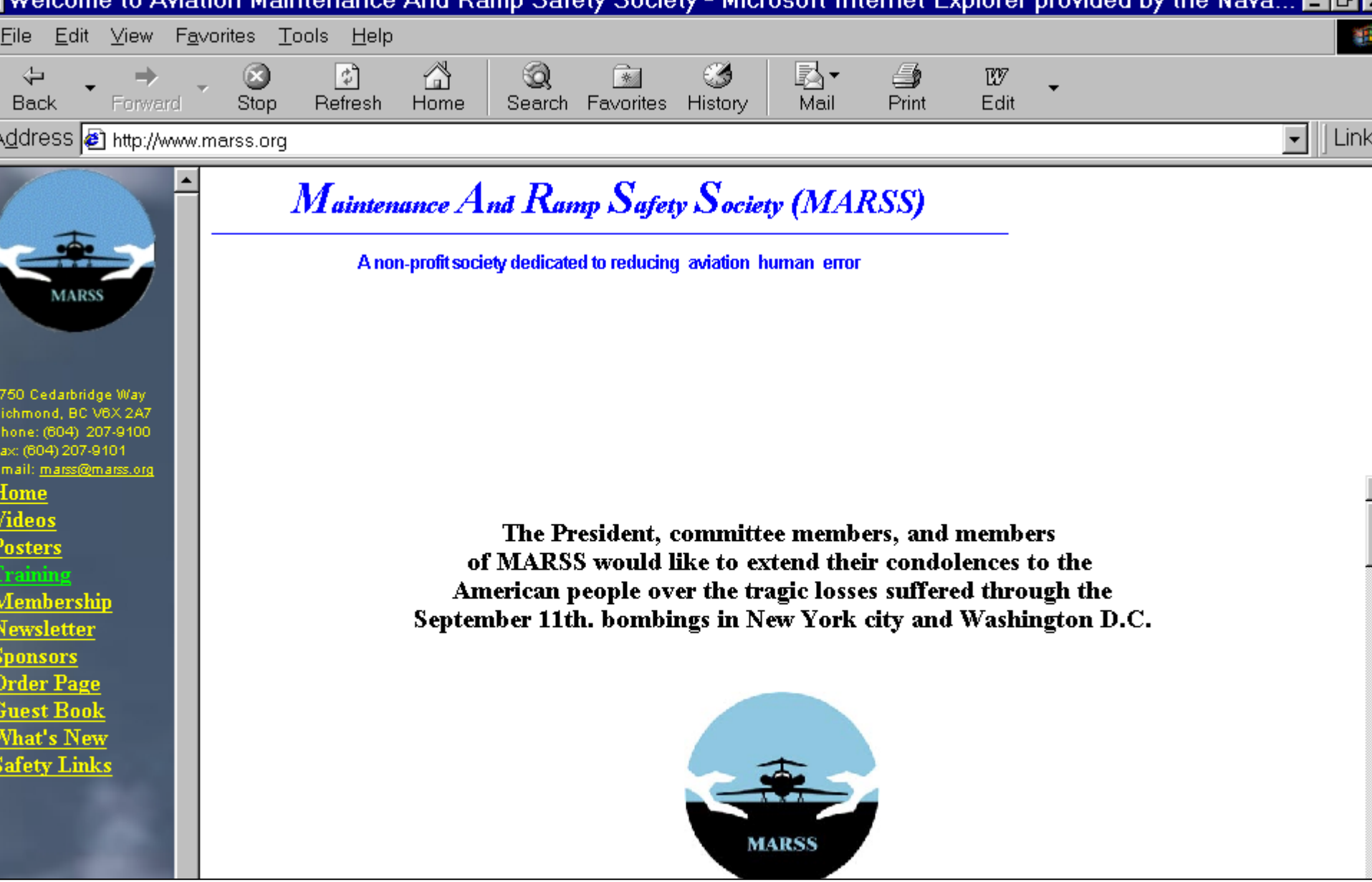
http://www.airlines.org- The ATA provides free access on their website to ATA SPEC 113: Maintenance Human Factors Program Guidelines, which outlines all of the recognized essential elements for effective error management.

Human Factors in Maintenance Programs





http://hfskyway.faa.gov- The FAA's Human Factors in Aviation Maintenance and Inspection Program website provides free access to research products, training materials, etc.



http://www.marss.org- The Maintenance and Ramp Safety Society website provides information on available MRM training videos, professional newsletters, posters, etc etc.

http://www.camc.ca- The Canadian Maintenance Council website provides information on available MRM courses, courseware, training materials, CBTs, posters, etc.

Technical Session Speakers:

- LCDR Rick Christoffersen USCG HQTRS USCG
  - *MRM in USCG Aviation Maintenance Risk Reduction*
- Dr. Bob Figlock (USMC Ret) Naval Postgraduate School
  - *Assessment of Naval Aviation Maintenance Safety Climate*
- Mr. Les Wethrington Naval Air Systems Command
  - *Human Error Investigation for Overhaul & Repair Operations*
- Dr. Katie Ricci Naval Air Systems Command Orlando
  - *Human Factors Issues in Maintenance Publication Design*