

INTRODUCTION TO THE COURSE

1 GENERAL

The course is aimed at engineers that may be involved directly or indirectly with the System Safety Assessment process. It is formulated on the assumption that the participants have had no previous formal instruction on safety analysis techniques and processes. Although the majority of the examples relate to large transport aircraft, the principles and methodologies are equally applicable to other categories of aircraft.

2 OBJECTIVES

The course is aimed at engineers and pilots that may be involved directly or indirectly with the System Safety Assessment process.

The objectives of the course are to give participants:

- An understanding of the methodology and analysis techniques for carrying out System Safety Assessments on Civil Aircraft.
- Familiarity with the mathematics and statistical distributions involved in the process
- A knowledge of some of the more common errors encountered in analysing aircraft systems
- An understanding of the interaction between the safety analysis process and systems architecture.
- An understanding of how the results of the safety analysis affect the maintenance and operation of aircraft.
- Familiarity with the relevant standards, advisory material, and reference documents.

3 COURSE OVERVIEW

The Course will constitute:

- Lectures with question periods. Participants are encouraged to ask questions during the lectures to ensure a common understanding.
- Tutorials where participants will be shown how to solve problems and will have the opportunity to work on problems individually and as a group.

Presentations will be on IT projectors. Participants may need to take some notes and will require pocket calculators for the tutorials. Course Notes are provided to the participants.

4 Course Content

The Course is designed to enable participants to gain both a broad overview of the safety analysis process and a working knowledge of the techniques and procedures used.

During the initial part of the course, an explanation will be given of the background to the safety analysis process, its relevance to the accident record, and the relevant airworthiness requirements. Particular attention will be given to CS 25.1309 and the associated Advisory Material.

An introduction to simple probability theory, relevant statistical distributions, and the methodology employed in the numerical determination of risk will be given.

During the tutorials, worked examples will be presented and the participants asked to carry out simple calculations to ensure an understanding of the techniques for deriving failure probabilities. Reference will also be made to sources of failure data and reference works on the subject.

Lectures will be given on the processes employed in the Safety Analysis process. This will entail instruction in the methodology for carrying out Fault Tree Analysis, Failure Mode and Effect Analysis, Zonal Safety Assessment, Design Appraisal, and the construction of Dependence Diagrams. The manner in which these techniques may be used to identify critical human factors issues will also be addressed. Other subjects to be covered will include:

- Systematic and Non-Systematic Failures
- Common Cause Failures
- Engine non-containment
- Problems to be Avoided (Common mistakes made in the safety analysis process)
- Master Minimum Equipment List
- In Service Reliability Monitoring
- Maintenance Analysis Techniques
- The Weibull Distribution

SYSTEM SAFETY ASSESSMENT COURSE

TIME	DAY 1	DAY 2	DAY 3
10:00	Introduction to the Course	Tutorial & Examples 1	Examples of the use of Fault Trees
11:00	Break		
11:15	Accident Rates & Airworthiness Requirements	Failure Theory 2	Maintenance Issues
12:15	The Advisory Material to 25.1309	Analysis Methods 2 (Fault Tree Analysis & Zonal Safety Assessment)	Tutorial and Examples 3
13:15	Lunch		
14:00	Probability Theory	Common Cause Failures	Minimum Equipment Lists
15:00	Failure Theory 1	Problems to be Avoided (Traps and Pitfalls)	In-Service Monitoring (Reliability Monitoring, Alert Levels, etc.)
16:00	Break		
16:15	Analysis Methods 1 (Dependence Diagrams, FMEAs, etc.)	Tutorial and Examples 2	Engine Non-Containment
17:15			
	<i>Additional Tutorials as required</i>	<i>Additional Tutorials as required</i>	