

Section 6

Examples of Damage Tolerant Analyses

The basic ingredients for damage tolerance analysis are the residual strength calculation and the crack growth prediction. These two subjects were dealt with in two previous sections. This section will show how crack growth and residual strength analysis are combined in a damage tolerance analysis of an actual structure in the various stages of design. Guidelines will be given on how to demonstrate compliance with the Airplane Damage Tolerance Design Requirements of JSSG-2006. The various options to qualify a structure will be reviewed.

In the next subsection, the general scheme for a damage-tolerance analysis will be given in the form of a stepwise procedure. Thereafter the option of inspectable versus non-inspectable qualification will be considered; the advantages and disadvantages of each will be summarized. Then an example will be given to show the consequences of selecting a certain qualification option. Finally, a number of example problems will be presented to illustrate the application of damage-tolerance analysis.