6.2 Shaping Constants for Atlas IIAS

6.2.1 Optimum Mode-5 Shaping Constants

Since the dynamic pressures that can cause the Atlas IIAS to break up were not available, random-attitude failures were simulated for a no-breakup case and for three breakup qα's: 20,000 deg-lb/ft^2, 10,000 deg-lb/ft^2, and 5,000 deg-lb/ft^2. For each case, 270,000 trajectories were run, giving a total of 1,080,000. It turned out that the value chosen for the breakup qα was critical in determining shaping constant A, since the lower the qα, the less the thrusting time before breakup, and the higher the percentages of impacts in sectors near the flight line.

For Atlas IIAS, the effects of qα on breakup are shown in Figure 6 where, for the selected qα's, the percentages of random-attitude turns that result in breakup before 280 seconds are plotted against failure time.

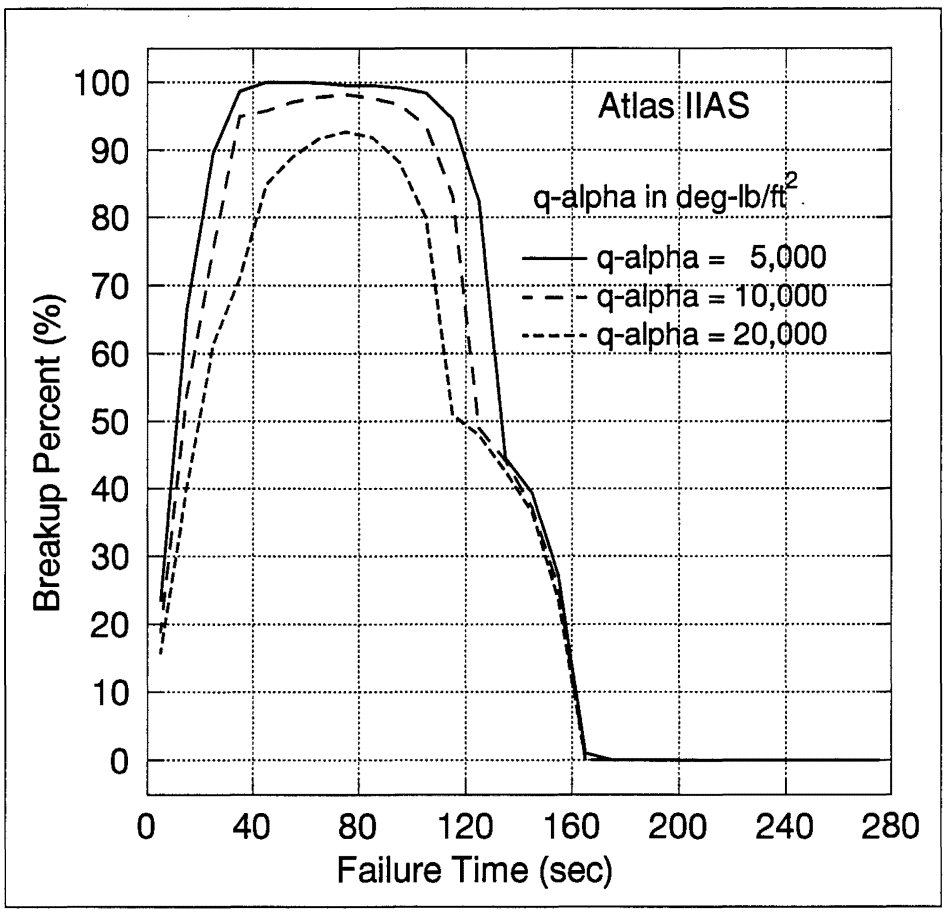

Figure 6. Atlas IIAS Breakup Percentages for Random-Attitude Turns

For failures between 10 and 30 seconds, most breakups do not occur at failure, but later in flight after the vehicle has built up significant velocity. For failures between 40 and 105 seconds, more than 80% breakup occurs, even for qα's as high as 20,000 deg-lb/ft^2.