

Traditionally, a value of $B = 1,000$ has been used by the 45 SW/SE in ship-hit calculations, and by RTI in performing launch-area risk analyses for the 45 SW/SE. Using this value of B , for each vehicle values of A were found that produced a good match between simulated and theoretical data. The results for $q\alpha = 5,000, 10,000,$ and $20,000$ deg-lb/ft² are given in Table 31. As discussed earlier in the report, no single value of A could be found that produced a good fit over the entire 180° sector, although with one exception a good match did exist in the uprange portion of the sector from about $\pm 90^\circ$ to $\pm 180^\circ$. For launches from Cape Canaveral, most population centers are located in this uprange sector. For any launch-area population centers located in the downrange sector, the risks are almost surely dominated by the Mode-4 failure response.

Table 31. Summary of A Values for $B = 1,000$

Vehicle	Flight Phase	T_B (sec)	Breakup $q\alpha$ (deg-lb/ft ²)		
			5,000	10,000	20,000
Atlas IAS	0 - 2	280	3.45	3.20	2.75
Delta-GEM	0 - 1	270	4.30	3.10	2.90
Titan IV	0 - 1	300	3.50	3.25	2.95
LLV1	0 - 2	290	2.75	2.70	2.60
Other vehicles	---	---	3.5	3.1	2.8

Other values of B were investigated to find combinations of B and A that provided the best possible data fits over the largest possible portion of the 0° to 180° sector. Although no combinations of A and B could be found that produced good fits for the entire 180° sector, the values shown in Table 32 extended the fit from the uprange direction to within about 40° of the downrange direction.

Table 32. Summary of Optimum Mode-5 Shaping Constants

Vehicle	Flight Phase	T_B (sec)	Breakup $q\alpha$ (deg-lb/ft ²)	B	A
Atlas	0 - 2	280	5,000	5,000,000	6.30
Delta	0 - 1	270	5,000	4	3.50
Titan	0 - 1	300	5,000	1,000	3.50
LLV1	0 - 2	290	5,000	1,000	2.75

Launch-area risk calculations were made for Atlas and Delta to ascertain the effects of using radically different values of A and B in the Mode-5 impact-density function. For example, for a breakup $q\alpha$ of 5,000 deg-lb/ft², values of $A = 3.45$ and $B = 1,000$ from Table 31 and $A = 6.30$ and $B = 5,000,000$ from Table 32 were used to determine total Mode-5 launch-area risks for an Atlas IAS launch from Complex 36. The total risks differed by about 10%. (Other results for Atlas IAS are given in Table 21, and for Delta in Table 23.) Other calculations for Atlas and Delta show that the value of B is not