Calculation of maximum dry ice load in DC-8-50 main cargo compartment

Based on:

- Sublimation rate: 14% per hour, at 70° F and sea level
  (.14) (8.5 cubic feet/lb.) = 1.19 cf/lb/hr
- Allowable CO_2 gas concentration: 0.5%
- Compartment volume: 11,521 cubic feet (cf)
- Air changes per hour: 16.4 w/ normal airflow and 8.2 w/ minimum airflow
- Formula from **AC** 130-4: X = Dry ice loading in pounds

$$X = \frac{(CO_2 \text{ concentration})\ (\text{Compartment volume in cf})(\text{Air changes/hr})}{(\text{Sublimation rate in cf/lb/hr})}$$

For normal airflow condition:

$$X = \frac{(0.005)\ (11{,}521 \text{ cf})\ (16.4/\text{hr})}{(1.19 \text{ cf/lb/hr})} = 794 \text{ lbs}$$

For minimum airflow condition:

$$X = \frac{(0.005)\ (11{,}521 \text{ cf})\ (8.2/\text{hr})}{(1.19 \text{ cf/lb/hr})} = 397 \text{ lbs}$$

Prepared on September 24, 1998, by Georgia Snyder, NTSB investigator-in-charge.