Notes

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1 Structures and thermal

Ch14 P401

1. The structure will mainly support payload during launch and a stable platform for measurements
2. Optical payloads require clean environments

Ch14 P417

1. Spacecraft natural frequencies must be separate from launch vehicle ones.
2. Load isolation systems have become more common in recent years. Flexures/Dampers
3. Solar panel shock loads are a concern
4. For precision pointing instruments, graphite composites do not change size over temperature. ”Effective optical bench structure uses graphite-composite face-sehets over an aluminium honeycomb core”. light and does not change over tempreature.

Ch22 P663 P668 basically tells me cad

1. Make sure each componenet can be assembled nicely to each other
2. Make sure everything is within fairing
3. Model FOV of cameras and sensors, and CG
4. CG limits

CH22 P668 15% to 20% of the mass of the spacecraft is the structure. Load analysis can only really be done later on, to look at sinusoidal loading, quasistatic loading, and random loading.

2 Micrometeorites

Bumper sizing

$$t_b = c_b d \frac{\rho_p}{\rho_b} \tag{1}$$

Where

- c_b = coefficient 0.25 when S/d ¡ 30, $c_b = 0.2$ when above
- d projeoctile diameter (cm)
- ρ_p = projectile density (g/cm^3)
- ρ_b = bumper density (g/cm^3)

- S = spacing between outer and rear wall (cm)
- t_b = bumper thickness (cm)

Rear wall sizing

$$t_w = c_w d^{0.5} (\rho_b \rho_p)^{\frac{1}{6}} (M_p)^{\frac{1}{3}} \frac{V_n}{S^{0.5}} (\frac{70}{\sigma})^{0.5} \tag{2}$$

Where

- c_w = 0.16 cm^2-sec (g^2/3 km)
- d = projectile diameter (cm)
- M_p = projectile mass (g)
- ρ_p = projectile density (g/cm^3)
- ρ_b = bumper density (g/cm^3)
- S = spacing between outer and rear wall (cm)
- σ = yield strength of rear wall material (ksi)
- t_w = rear wall thickness (cm)
- V_n = normal velocity of projectile (km/sec)