

N86 - 27323 D26-18
6P.

STRUCTURAL INTEGRITY OF GAS EJECTION SYSTEM

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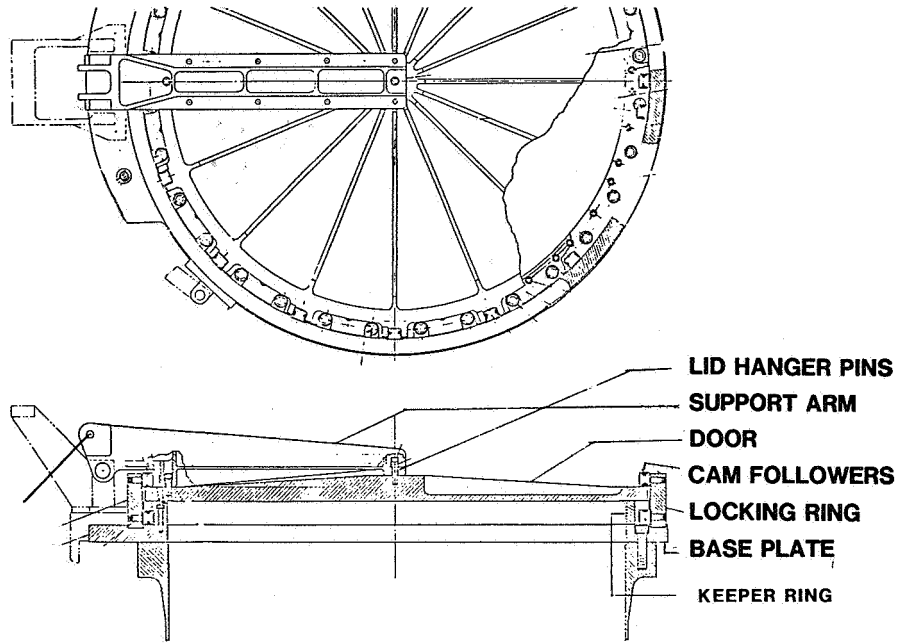
Get Away Special (GAS) Experimenters Symposium 1985
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- **COMPONENTS ANALYZED**
- **APPLICABLE ENVIRONMENTS**
- **LOADS**
- **SPECIAL CONSIDERATIONS**
- **EXPERIMENTER CONSTRAINTS**

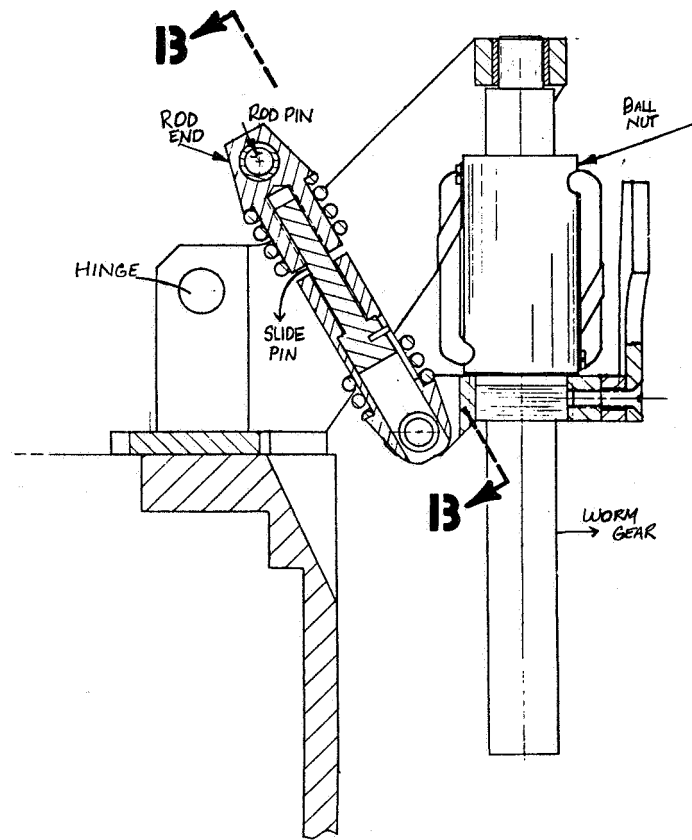
COMPONENTS ANALYZED

- **FULL DIAMETER MOTORIZED DOOR ASSEMBLY (FDMDA)**
- **ACTUATING ASSEMBLY**
- **GAS EJECTION SYSTEM**
- **LOWER END PLATE**
- **BATTERY BOXES**

8000-042

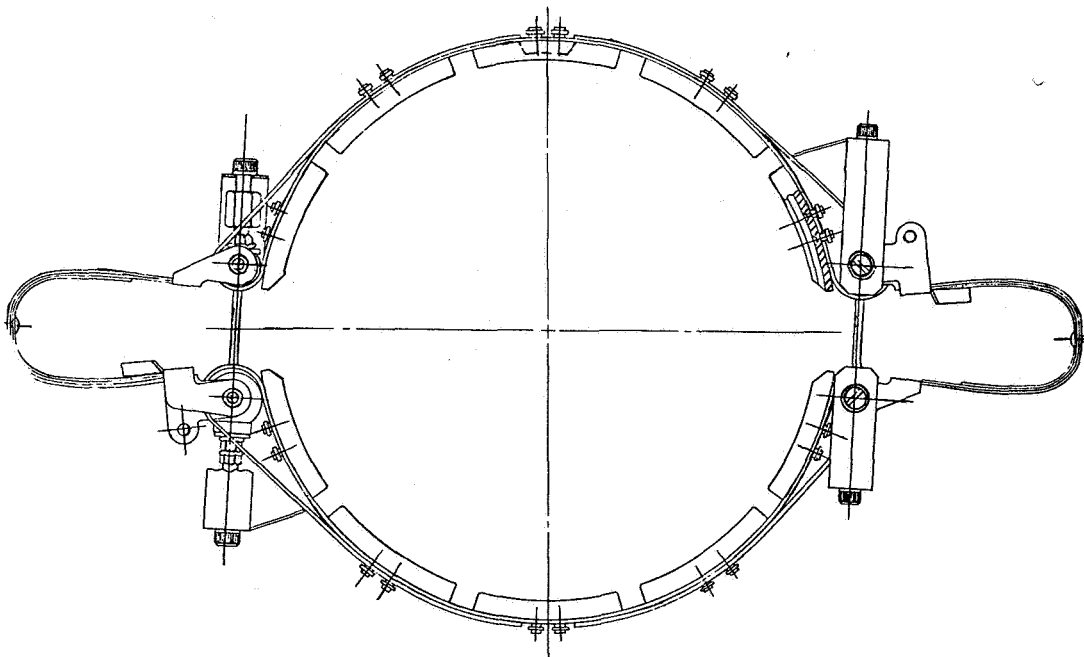
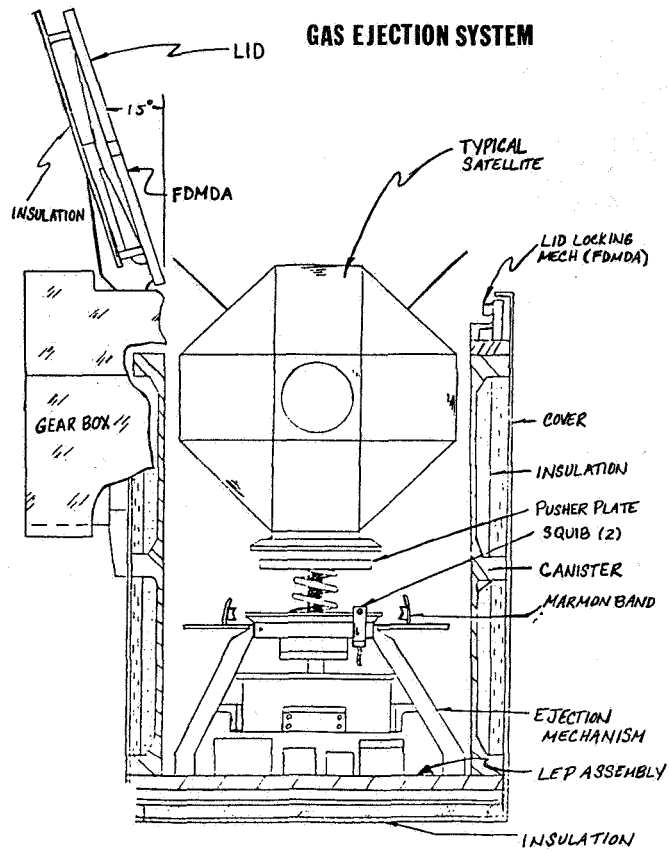


FDMDA ASSEMBLY



ACTUATING ASSEMBLY

ORIGINAL PAGE IS
OF POOR QUALITY



MARMON BAND
CLAMP

ENVIRONMENTS

- **LIFTOFF**
 - **LOW FREQUENCY TRANSIENTS (QUASI-STATIC)**
 - **HIGH FREQUENCY RANDOM/ACOUSTIC LOADS**
- **LANDING**
 - **EMERGENCY LANDING LOADS (EXTREME CASE)**
 - **THERMAL GRADIENTS**
 - **ANOMALIES**
- **ON ORBIT**
 - **THERMAL GRADIENTS**
 - **ANOMALY**

LOADS

- **OBTAINED FROM COUPLED LOADS ANALYSIS OF ORBITER**
- **UPDATED FROM ACTUAL FLIGHT DATA**

**LOAD FACTORS FOR STRUCTURAL ASSESSMENT OF
APC, EAPC, AND GAS BEAM MOUNTED PAYLOADS**

EVENT	LOAD FACTOR, G			ANGULAR ACCELERATION, rd/s ²		
	NX	NY	NZ	$\ddot{\theta}_X$	$\ddot{\theta}_Y$	$\ddot{\theta}_Z$
LIFTOFF						
LOW FEQUENCY	±7	±7	±6	±75	±20	±55
VIBRATION	±5.4	±8.0	±5.4			
COMBINATION (RSS ON ONE AXIS AT A TIME)						
1	±8.8	±7	±6	±75	±20	±55
2	±7	±10.6	±6	±75	±20	±55
3	±7	±7	±8.1	±75	±20	±55
LANDING	±6	±7	±8	±85	±30	±50

SPECIAL CONSIDERATIONS

- **BATTERY BOXES**
 - LEAKAGE IN VACUUM
 - SEALED TO MAINTAIN 1 ATMOSPHERE
 - MET ADDITIONAL SAFETY REQUIREMENTS OF NHB 1700.7A FOR SEALED CONTAINERS/PRESSURE VESSELS

- **ANOMALIES**
 - DOOR FAILED OPEN (LANDING)
 - - SAFE IN MOST UNFAVORABLE ORIENTATION
 - SATELLITE LOOSE IN CAN (LANDING, LIFTOFF)
 - - DOOR DESIGNED FOR CONTAINMENT
 - SATELLITE EJECTION WITH DOOR CLOSED (ON ORBIT)
 - - IMPACT STRENGTH DETERMINED

EXPERIMENTER CONSTRAINTS

- **WEIGHT LIMITATIONS (150 LB SATELLITE)**
 - BASED ON 2 CANS PER GAS BEAM
 - LIMIT IMPOSED BY INTERFACE (MOUNTING) TO ORBITER
- **C.G. LIMITATIONS (1/2 INCH FROM CENTER OF CAN)**
 - PREVENTS EXCESSIVE MOMENTS ON MOUNTING HARDWARE
- **RESONANT FREQUENCY**
 - MAIN ASSEMBLY > 25 HZ
 - SUB ASSEMBLIES > 35 HZ
 - - DERIVED FROM FREQUENCY CONTENT OF QUASI-STATIC (LOW FREQUENCY) LOADS
 - - REDUCES EFFORT AND EXPENSE REQUIRED IN PERFORMING COUPLED LOADS ANALYSIS

EXPERIMENTER CONSTRAINTS CONTINUED

● EJECTION VELOCITY

- < 2 FT/SEC
 - WOULD NOT CLEAR ORBITER
- > 7 FT/SEC @ 150 LB SATELLITE WEIGHT
 - DOOR WOULD NOT CONTAIN SATELLITE IF EJECTED PREMATURELY
 - BASED ON RUPTURE STRENGTH OF DOOR
- TYPICAL EJECTION VELOCITIES
 - 4 ± 5 FT/SEC

TOTAL LIFTOFF DYNAMIC LOADS

