

***LOAD_BODY_OPTION**

Available options include for base accelerations:

X

Y

Z

for angular velocities:

RX

RY

RZ

for loading in any direction, specified by vector components:

VECTOR

and to specify a part set:

PARTS

Purpose: Define body force loads due to a prescribed base acceleration or angular velocity using global axes directions. This data applies to all nodes in the complete problem unless a part subset is specified via the *LOAD_BODY_PARTS keyword. If a part subset is defined then all nodal points belonging to the subset will have body forces applied. The parts specified via the *LOAD_BODY_PARTS keyword apply to the options X, Y, Z, RX, RY, and RZ above, i.e., different part sets may not apply to different options. Only one part set is expected. **Note: This option applies nodal forces, i.e., it cannot be used to prescribe translational or rotational motion.** Two keyword definitions are needed to apply body loads on a subset of parts: *LOAD_BODY_X and *LOAD_BODY_PARTS.

For options: X, Y, Z, RX, RY, RZ and VECTOR.

Card 1 1 2 3 4 5 6 7 8

Variable	LCID	SF	LCIDDR	XC	YC	ZC	CID	
Type	I	F	I	F	F	F	I	
Default	none	1.	0	0.	0.	0.	0	

*LOAD

*LOAD_BODY

For option: PARTS.

Card 1 1 2 3 4 5 6 7 8

Variable	PSID							
Type	I							
Default	none							

For option: VECTOR.

Card Format (3E10.0)

REQ 2 1 2 3 4 5 6 7 8

Variable	V1	V2	V3					
Type	F	F	F					
Default	0.0	0.0	0.0					

VARIABLE

DESCRIPTION

LCID	Load curve ID, see *DEFINE_CURVE.
SF	Load curve scale factor
LCIDDR	Load curve ID for dynamic relaxation phase (optional). This is needed when dynamic relaxation is defined and a different load curve to LCID is required during the dynamic relaxation phase. Note if LCID is undefined then no body load will be applied during dynamic relaxation regardless of the value LCIDDR. See *CONTROL_ DYNAMIC_ RELAXATION
XC	X-center of rotation, define for angular velocities.
YC	Y-center of rotation, define for angular velocities.
ZC	Z-center of rotation, define for angular velocities.
CID	Coordinate system ID to define acceleration in local coordinate system. The accelerations (LCID) are with respect to CID.

<u>VARIABLE</u>	EQ.0: global	<u>DESCRIPTION</u>
PSID		Part set ID.
V1, V2, V3		Vector components of vector V.

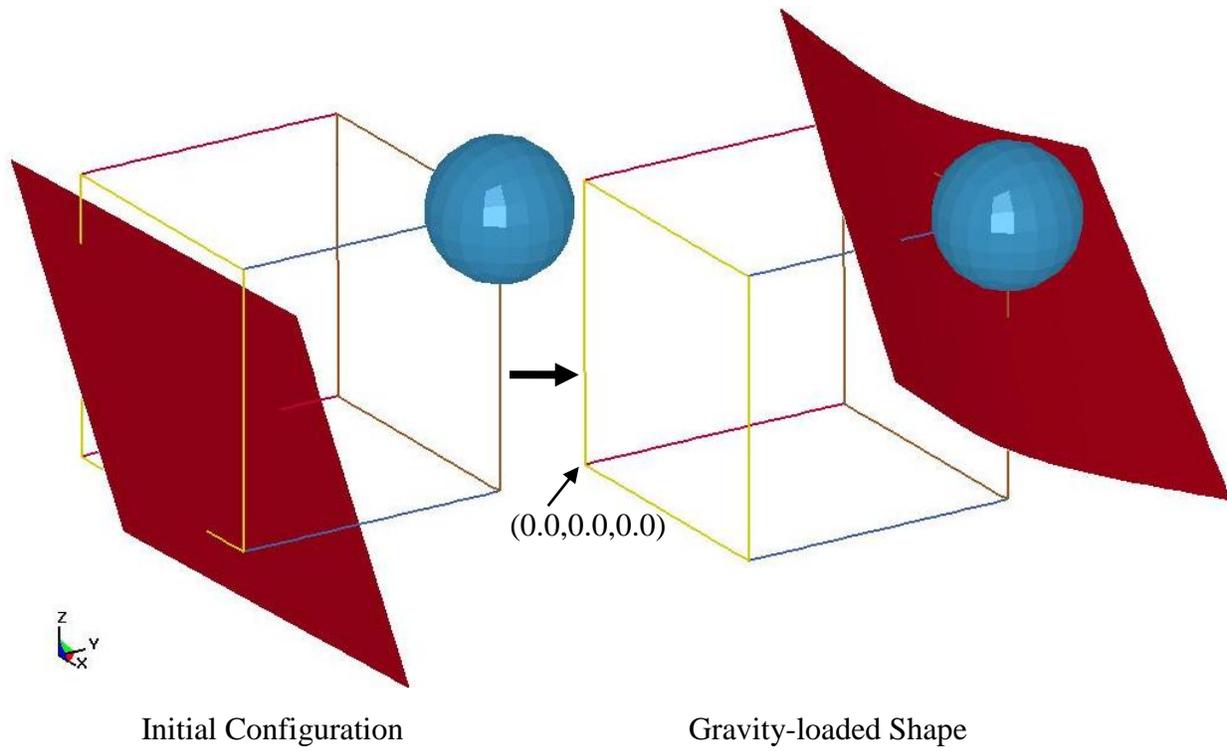
Remarks:

1. Translational base accelerations allow body forces loads to be imposed on a structure. Conceptually, base acceleration may be thought of as accelerating the coordinate system in the direction specified, and, thus, the inertial loads acting on the model are of opposite sign. For example, if a cylinder were fixed to the y-z plan and extended in the positive x-direction, then a positive x-direction base acceleration would tend to shorten the cylinder, i.e., create forces acting in the negative x-direction.
2. Base accelerations are frequently used to impose gravitational loads during dynamic relaxation to initialize the stresses and displacements. During the analysis, in this latter case, the body forces loads are held constant to simulate gravitational loads. When imposing loads during dynamic relaxation, it is recommended that the load curve slowly ramp up to avoid the excitation of a high frequency response.
3. Body force loads due to the angular velocity about an axis are calculated with respect to the deformed configuration and act radially outward from the axis of rotation. Torsional effects which arise from changes in angular velocity are neglected with this option. The angular velocity is assumed to have the units of radians per unit time.
4. The body force density is given at a point P of the body by:

$$b = \rho(\omega \times \omega \times r)$$

where ρ is the mass density, ω is the angular velocity vector, and r is a position vector from the origin to point P. Although the angular velocity may vary with time, the effects of angular acceleration are not included.

5. Angular velocities are useful for studying transient deformation of spinning three-dimensional objects. Typical applications have included stress initialization during dynamic relaxation where the initial rotational velocities are assigned at the completion of the initialization, and this option ceases to be active.



8. The `_VECTOR` option is available in LS-DYNA R5 Revision 59290 and later releases.