

BAS020 Output Clarification

Definition of Local Axes for Hinge Loads

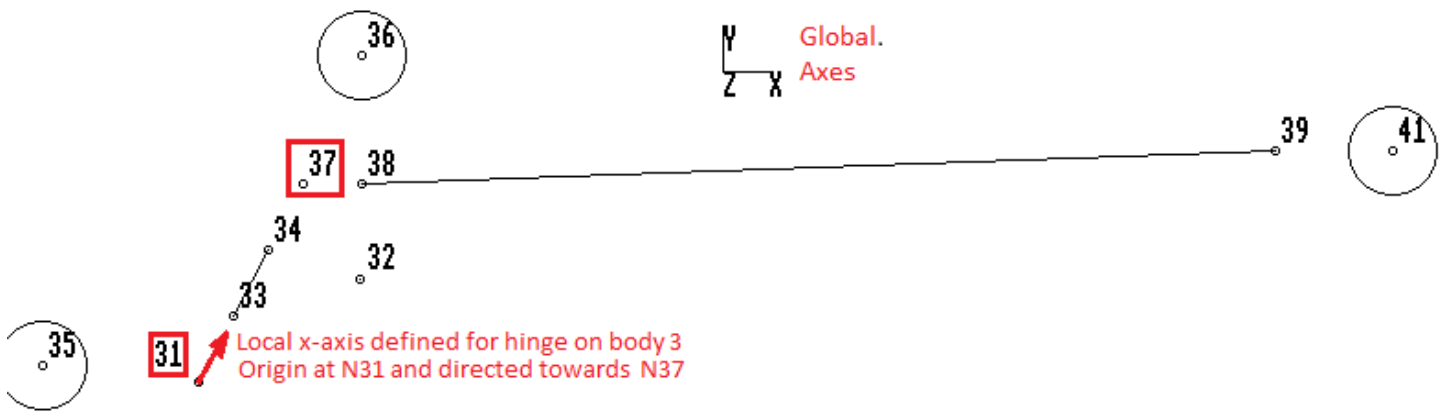
Hinges connect two bodies. In this case, body 3 is supported at node 31 by body 2 at node 22. Nodes 22 and 31 are coincident. It is convenient to have separate local axes defined for each of the supported and supporting bodies because it is normal for them to have different structural arrangements and so that local axes may rotate with hinge rotation.

Input data line defining hinge for body 3:

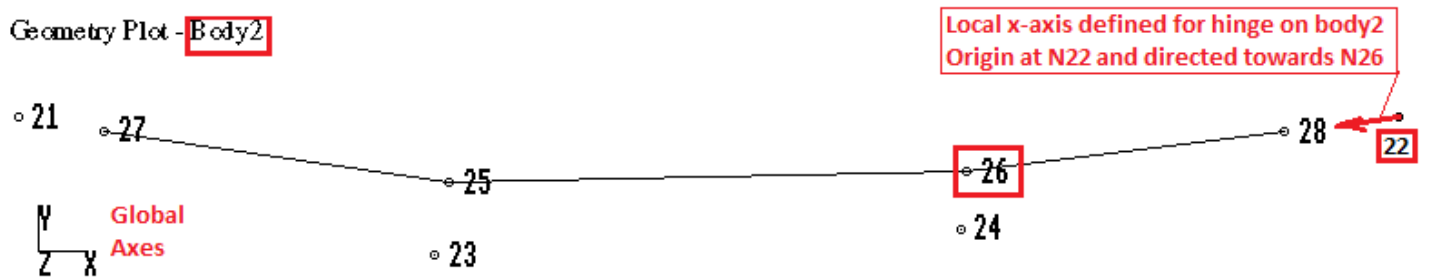
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BHINGE 3      31      22      37      26      180/2      180/2
```

Mark-up of body definition plot:

Geometry Plot - **Body3**

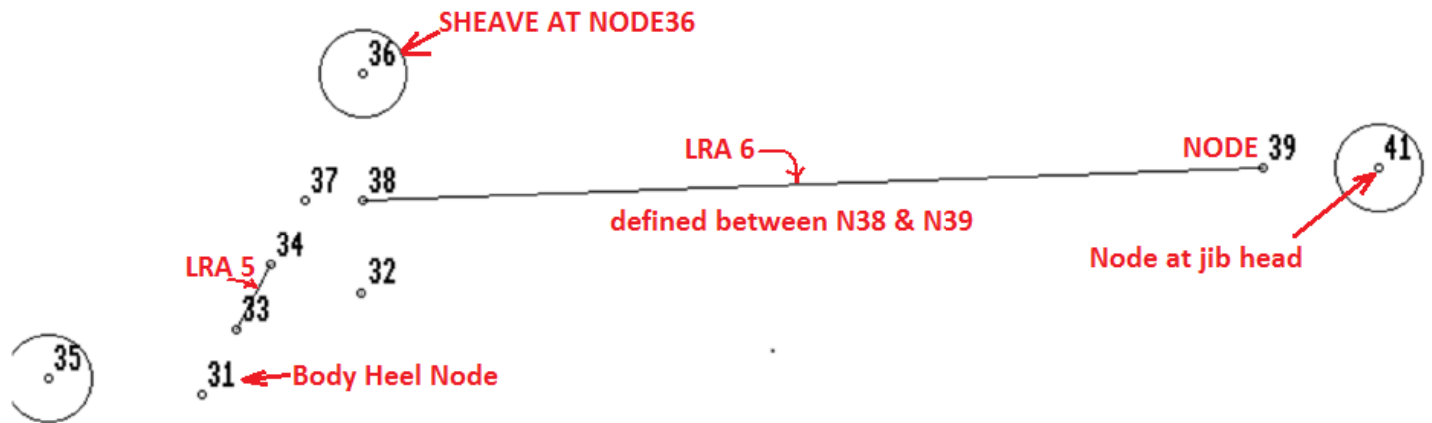


Geometry Plot - **Body2**



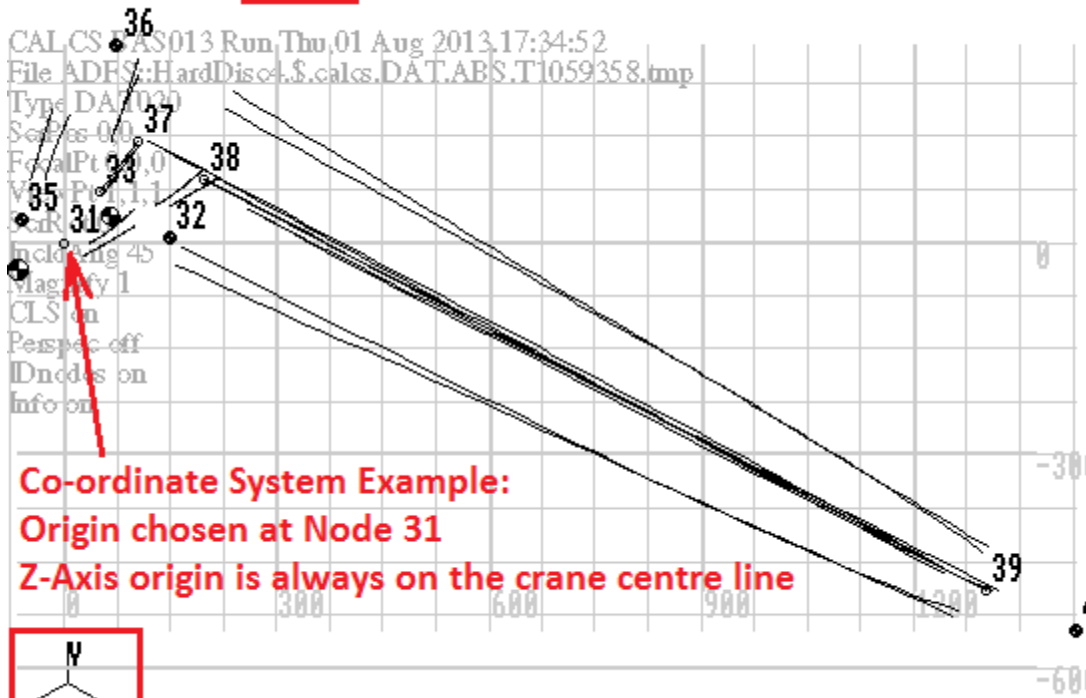
Mark-up of Body Definition Plot

Geometry Plot - **Body3**

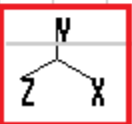


Definition of Co-ordinate System

Geometry Plot - **Body3**



Co-ordinate System Example:
Origin chosen at Node 31
Z-Axis origin is always on the crane centre line



Mark-up of Output General Data

0001	OUT020									
0003	cas	MI	FXI	FYI	FZI	FX	FY	FZ	Ts	Is
0004	1	33.1	-0.042	1.4	0.126	0.03	1	0.09	-5.65E4	2.132E9
	LOAD CASE	LIVE LOAD (t)	ACCELERATION FACTOR APPLIED TO LIVE LOAD PARALLEL TO GLOBAL X-AXIS	PARALLEL TO GLOBAL Y-AXIS	PARALLEL TO GLOBAL Z-AXIS	ACCELERATION FACTOR APPLIED TO CRANE DEAD WEIGHT PARALLEL TO GLOBAL X-AXIS	PARALLEL TO GLOBAL Y-AXIS	PARALLEL TO GLOBAL Z-AXIS	SLEWING TORQUE	ROTATIONAL INERTIA

Mark-up of Output for Rope & Heel Loads

0020	ROPE & GLOBAL HEEL LOADS									
0021	cas	body	Ab	Pr	PXh	PYh	PZh	MXh	MYh	MZh
0022	1	1	0	46.36	3.097	195.3	17.58	4.678E4	-5.619E4	6.185E5
	LOAD CASE		ANGLE OF BODY FROM INITIAL DEFINITION	FORCE IN ROPE SUPPORTING BODY	HEEL FORCE SUPPORTING BODY PARALLEL TO GLOBAL X-AXIS	PARALLEL TO GLOBAL Y-AXIS	PARALLEL TO GLOBAL Z-AXIS	HEEL MEMENT SUPPORTING BODY PARALLEL TO GLOBAL X-AXIS	PARALLEL TO GLOBAL Y-AXIS	PARALLEL TO GLOBAL Z-AXIS

Mark-up of Output for Hinges at the Heel of Each Body

0068	BHINGE, HINGE PIN LOADS, +z & -z, 1st & 2nd AXES								
0069	cas	body	P	Px	Py	P	Px	Py	Pz
0070			+z	+z	+z	-z	-z	-z	
0071	1	2	850.6	846.7	80.85	477.6	468.9	90.44	17.58
0072	1	2	850.6	-204.7	825.6	477.6	-158.5	450.5	

LOAD CASE

**HINGE RESULTANT FORCE
(Hinge on +ve Z side of crane)**

HINGE FORCE RESOLVED PARALLEL TO LOCAL X-AXIS

HINGE FORCE RESOLVED PARALLEL TO LOCAL Y-AXIS

**HINGE RESULTANT FORCE
(Hinge on -ve Z side of crane)**

HINGE FORCE RESOLVED PARALLEL TO LOCAL X-AXIS

HINGE FORCE RESOLVED PARALLEL TO LOCAL Y-AXIS

**SUM OF TRANSVERSE FORCES
Shared between +ve z & -ve z hinges**

Output of Loads

0136	LOADS on LRA at node, before/after/difference									
0137	cas	LRA	N	Px	Py	Pz	Mx	My	Mz	
0243	2	6	36	-106.8	-61.16	-7.312	53.25	1.283E4	-1.081E5	LOADS BEFORE NODE 36
0244	2	6	36	-90.47	-113.3	-7.312	53.25	1.283E4	-1.117E5	LOADS AFTER NODE 36
0245	2	6	36	-16.28	52.12	0	0	0	3580	DIFFERENCE BETWEEN BEFORE & AFTER LOADS
0246	2	6	38	-90.47	-113.3	-7.312	53.25	1.289E4	-1.126E5	
0247	2	6	38	-108.3	-139.9	-10.19	53.25	1.289E4	-1.126E5	
0248	2	6	38	17.86	26.57	2.88	1.937E-7	0	0	
0249	2	6	39	-106.8	-61.16	-7.312	53.25	1461	-1.3E4	
0250	2	6	39	-106.8	-61.16	-7.312	53.25	1461	-1.3E4	
0251	2	6	39	0	0	0	0	0	0	

Output Stresses

0994	STRESSES on LRA before/after node										
0995	cas	LRA	N	fd1	fd2	fd3	fd4	fs5	fs6	fs7	
1066	2	6	36	1.002	-0.8274	-1.14	0.6894	0.07705	0.01052	0.01052	STRESSES BEFORE NODE
1067	2	6	36	1.042	-0.8467	-1.159	0.7298	0.1424	0.01052	0.01052	STRESSES AFTER NODE
1068	2	6	38	1.048	-0.8515	-1.165	0.7349	0.1413	0.01049	0.01049	
1069	2	6	38	1.037	-0.8634	-1.177	0.7238	0.1743	0.01477	0.01477	
1070	2	6	39	0.4639	-0.6525	-0.7324	0.384	0.1955	0.01786	0.01786	
1071	2	6	39	0.4639	-0.6525	-0.7324	0.384	0.1955	0.01786	0.01786	

Output Stresses - Sorted

Post-Processing of Stresses - Sorted into Order of Magnitude by Spreadsheet

994	STRESSES on LRA before/after node (t/cm2)						
995	cas	LRA	N	fd max	fd min	fs max	
1016	1	3	25	1.984	-2.085	0.2099	
1017	1	3	25	1.984	-2.085	0.2099	