4. BOUNDARY CONDITIONS DATA GROUP

4.1 SPC - SINGLE - POINT CONSTRAINTS

Displacement boundary conditions at nodes.

SPC ID	LCS ID DOFs NODES
ID	Identification number for the SPC (positive integer)
LCS ID	ID number for the local coordinate system
DOFs	Degree of freedoms contain values of all translation and rotation
	components to be specified as a single data-field separated by the character
	'/' , ie, Ux/Uy/Uz/Rx/Ry/Rz. A free DOF is left blank.
	Ux- Value of translation component in X-direction.
	Uy- Value of translation component in Y-direction.
	Uz- Value of translation component inZ-direction.
	Rx – Value of rotation component about X-direction
	Ry – Value of rotation component about Y-direction
	Rz – Value of rotation component about Z-direction
NODES	List of nodes on which the SPC is specified (Section 7.0)
EXAMPLES	:-

SPC, 1, 0, 0/0/0/0/0, 1T7	Nodes 1 to 7 are fully contained
SPC, 2, 0, /1.5, 10/22	UY = 1.5 for nodes 10 and 22 and all other DOFs are free
SPC, 3, 0, 0//0, 15	UX = 0 and $UZ=0$ for node 15 and all other DOFs are free

4.2 MPC - MULTI POINT CONSTRAINTS

A linear constraint equation of the form $A_1X_1 + A_2X_2 + ... = C$ may be specified in the data group, where X_1 , X_2 are DOFs associated with different nodes, A_1 , A_2 and C are constants

MPC	N1	X1	A1	N2	X2	A2	••	••	
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N1,N2.. Nodes that appear in the constraint equation

X1, X2,... Degrees of freedom (0-5) in the constraint equation

A1,A2,.. Constants in the constraint equation.

Note that the terms of the equation are specified as triplets (N1, X1, A1), (N2, X2,A2),... and as such the constant C, if it is non-zero, has to be specified as the triplet (0, 0, C).

Eg: - the constraint equation

 $1.5 U_{10} - 0.5 U_{16} = 0.1$,

where U_{10} is the UX of node 10 and U_{16} is UX of node 16, is specified as

MPC, 10, 0, 1.5, 16, 0, -0.5, 0, 0, 0.1

4.3 HTTEMPR – Nodal temperature for Heat Transfer analysis

HTTEMPR	ID	TEMP	NODES
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- *ID* Identification number for HTTEMPR
- *TEMP* Nodal temperature

NODES List of nodes on which the temperature is specified (Section 7.0)

Eg:- HTTEMPR, 1, 0, 1T111B11

4.4 HTFLUX – Heat flux

HTFLUX	ID	Value	Edge/face

- *ID* Identification number for HTFLUX
- *Value* Heat flux rate
- *Edge/face* Element edge / face
- Eg:- HTFLUX, 1, 1000, 10T100B10(D2)

4.5 HTGEN – Heat generation

HTGEN	ID	Value	EId
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ID Identification number for HTGEN

Value Heat generation rate

EId List of element IDs

Eg:- HTGEN, 1, 45, 1/28/29T34

4.6 HTCONV – Convection

HTCONV	ID	Con.coeft	Am.Temp	Edge/face
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- *ID* Identification number for HTCONV
- *Con.coeft* convective film coefficient
- *Am.Temp* Ambient temperature
- *Edge/face* List of element edges/faces
- Eg:- HTCONV, 1, 45, 8, 11T19(D4)

4.7 HTRADABS – Radiative absorption

HTRADABS	ID	Abp	Sou.Temp	Edge/face		
ID	Identif	ication numb	er for HTRAD	ABS		
Abp	Absorp	otivity				
Sou.Temp	Source temperature					
Edge/face	List of	element edge	es/faces			
Eg:-	HTRA	DABS, 1, 10), 45, 36T39(D	4)		

4.8 HTRADEMISION – Radiative Emission

HTRADEMISION	ID	Abp	Sou.Temp	Edge/face

- *ID* Identification number for HTRADABS
- *Abp* Absorptivity
- *Sou.Temp* Source temperature
- *Edge/face* List of element edges/faces

Eg:- HTRADEMS, 1, 42, 2, 51T54(D4)