

Part 1 - Structural modeling

In windows file explorer, Create “**Training Project**” directory, and create “**Structural Modeling**” subdirectory.

In SACS executive, use “**Settings**” > “**SACS System Configuration**”, make sure default units set to “**Metric KN Force**”.

Set current working directory to “**Structural Modeling**” and launch Precede program and using following data,

Creating Jacket,

Select “**Create New Model**” and input “**TEST MODEL WITH WEIGHT CAPABILITIES**” for title.

Select “**Jacket**” in Structure Wizard and check “**Generate Seastate hydrodynamic overrides**”.

4 Leg 4 Pile (ungrouted) jacket platform
Water depth 79.5 m

Working point elevation: 4.0 m
Pile connecting elev: 3.0 m
Mudline elevation and pile stub elevation: -79.5m
Other intermediate elevations: -50.0, -21.0, 2.0, 15.3, 23.0 m

Conductors: None

Skirt Piles: None

Working point spacing: X1=15 m, Y1=10 m

Pile/Leg Batter: Row 1 (leg 1 and leg 5, left two legs) X=0, Y=10
Row 2 (leg 3 and leg 7, right two legs) X=10, Y=10

Save model to SACINP.DAT file.

Define member properties;

Member Group **LG1, LG2, LG3,**

Segment 1: D = 107 cm, T = 3.5 cm, $F_y = 34.50 \text{ kN/cm}^2$, Segment Length = 1.0 m
Segment 2: D = 105 cm, T = 2.5 cm, $F_y = 24.80 \text{ kN/cm}^2$
Segment 3: D = 107 cm, T = 3.5 cm, $F_y = 34.50 \text{ kN/cm}^2$, Segment Length = 1.0 m

Member Group **LG4**,

Segment 1: D = 107 cm, T = 3.5 cm, Fy = 34.50 kN/cm²

Member Group **LG5**,

Segment 1: D = 91.50 cm, T = 2.50 cm, Fy = 34.50 kN/cm²

Member Group **LG6**,

Segment 1: D = 91.5 cm, T = 2.0 cm, Fy = 24.80 kN/cm² Segment Length = 1.0 m

Segment 2: **CONE** Fy = 24.80 kN/cm², Segment Length = 1.5 m

Segment 3: D = 66.0 cm, T = 2.0 cm, Fy = 24.80 kN/cm²

Member Group **LG7**,

Segment 1: D = 66.0 cm, T = 2.00 cm, Fy = 24.80 kN/cm²

Member Group **PL1, PL2, PL3 and PL4**,

Segment 1: D = 91.5 cm, T = 2.5 cm, Fy = 24.80 kN/cm², Flooding,

Member Group **W.B**,

Segment 1: D = 60.0 cm, T = 2.0 cm, Weight Density = 0.001, Flooding,

Member Section **CONE**,

Outside D = 91.50 cm, Inside d = 66.0 cm and Wall thickness T = 2.0 cm

Save model.

Member section and member groups defined at this time shall look like following:

SECT										
SECT	CONE	CON		91.502.000 66.00						
GRUP										
GRUP LG1		107.00	3.500	20.00	8.0034.50	1	1.001.00	0.50N	7.8491.00	
GRUP LG1		105.00	2.500	20.00	8.0024.80	1	1.001.00	0.50N	7.849	
GRUP LG1		107.00	3.500	20.00	8.0034.50	1	1.001.00	0.50N	7.8491.00	
GRUP LG2		107.00	3.500	20.00	8.0034.50	1	1.001.00	0.50N	7.8491.00	
GRUP LG2		105.00	2.500	20.00	8.0024.80	1	1.001.00	0.50N	7.849	
GRUP LG2		107.00	3.500	20.00	8.0034.50	1	1.001.00	0.50N	7.8491.00	
GRUP LG3		107.00	3.500	20.00	8.0034.50	1	1.001.00	0.50N	7.8491.00	
GRUP LG3		105.00	2.500	20.00	8.0024.80	1	1.001.00	0.50N	7.849	
GRUP LG3		107.00	3.500	20.00	8.0034.50	1	1.001.00	0.50N	7.8491.00	
GRUP LG4		107.00	3.500	20.00	8.0034.50	1	1.001.00	0.50N	7.849	
GRUP LG5		91.500	2.500	20.00	8.0034.50	1	1.001.00	0.50N	7.849	
GRUP LG6		91.500	2.000	20.00	8.0024.80	1	1.001.00	0.50N	7.8491.00	
GRUP LG6	CONE			20.00	8.0024.80	1	1.001.00	0.50N	7.8491.50	
GRUP LG6		66.000	2.000	20.00	8.0024.80	1	1.001.00	0.50N	7.849	
GRUP LG7		66.000	2.000	20.00	8.0024.80	1	1.001.00	0.50N	7.849	
GRUP PL1		91.500	2.500	20.00	8.0024.80	1	1.001.00	0.50F	7.849	
GRUP PL2		91.500	2.500	20.00	8.0024.80	1	1.001.00	0.50F	7.849	
GRUP PL3		91.500	2.500	20.00	8.0024.80	1	1.001.00	0.50F	7.849	
GRUP PL4		91.500	2.500	20.00	8.0024.80	1	1.001.00	0.50F	7.849	
GRUP W.B		60.000	2.000	20.00	8.0024.80	1	1.001.00	0.50F	0.001	

Add members to Horizontal Framings of jacket,

Plane XY for Z=-79.50

Add 4 horizontals **H11** and breaking them in equal part, make joint name start from 1000.
Add 4 diamond shape diagonals **H12**.

Plane XY for Z=-50.00

Add 4 horizontals **H21** and breaking them in equal part, make joint name start from 2000.
Add 4 diamond shape diagonals **H22**.

Plane XY for Z=-21.00

Add 4 horizontals **H31**.
Add X-brace support, input Center Joint = 3000 and group label **H32** and follow joint orders.

Plane XY for Z=2.00

Add 4 horizontals **H41**.
Add X-brace support, input Center Joint =4000 and group label **H42** and follow joint orders.

Save model.

Define horizontal member properties;

Member Group **H11**, Segment 1: D = 66.0 cm, T = 2.5 cm

Member Group **H12**, Segment 1: D = 62.0 cm, T = 2.0 cm

Member Group **H21**, Segment 1: D = 50.75 cm, T = 2.0 cm

Member Group **H22**, **H31** and **H32**, Segment 1: D = 40.75 cm, T = 1.5 cm

Member Group **H41** and **H42**, Segment 1: D = 30.375 cm, T = 1.25 cm

Horizontal member groups defined at this time shall look like following:

GRUP H11	66.000	2.500	20.00	8.0024.80	1	1.001.00	0.50N 7.849
GRUP H12	62.000	2.000	20.00	8.0024.80	1	1.001.00	0.50N 7.849
GRUP H21	50.750	2.000	20.00	8.0024.80	1	1.001.00	0.50N 7.849
GRUP H22	40.750	1.500	20.00	8.0024.80	1	1.001.00	0.50N 7.849
GRUP H31	40.750	1.500	20.00	8.0024.80	1	1.001.00	0.50N 7.849
GRUP H32	40.750	1.500	20.00	8.0024.80	1	1.001.00	0.50N 7.849
GRUP H41	32.375	1.250	20.00	8.0024.80	1	1.001.00	0.50N 7.849
GRUP H42	32.375	1.250	20.00	8.0024.80	1	1.001.00	0.50N 7.849

Add diagonal members to jacket rows,

Face Row A, add 103L-201L as **D01**, 201L-303L as **D02** and 303L-401L as **D03**;
Face Row B, add 107L-205L as **D01**, 205L-307L as **D02** and 307L-405L as **D03**;
Face Row 1, add 105L-201L as **D01**, 201L-305L as **D02** and 305L-401L as **D03**;
Face Row 2, add 107L-203L as **D01**, 203L-307L as **D02** and 307L-403L as **D03**;

Save model.

Define member properties;

Member Group D01, Segment 1: D = 66.0 cm, T = 2.5 cm

Member Group D02, Segment 1: D = 50.75 cm, T = 2.0 cm

Member Group D03, Segment 1: D = 40.75 cm, T = 1.5 cm

Diagonal member groups defined at this time shall look like following:

GRUP D01	66.000	2.500	20.00	8.0024.80	1	1.001.00	0.50N 7.849
GRUP D02	50.750	2.000	20.00	8.0024.80	1	1.001.00	0.50N 7.849
GRUP D03	40.750	1.500	20.00	8.0024.80	1	1.001.00	0.50N 7.849

Creating Deck,

Using **GRID** command under joint, create cellar deck and main deck framings and create deck plate automatically,

Cellar Deck

Grid structure plane = XY, other coordinate Z = 15.3 m;

Joint name of grid origin = 7001, X increment = 4 and Y increment = 1;

Check “Use existing joint if new joint is coincident”

Grid coordinates for cellar deck:

X = -7.5, -2.5, 2.5, 7.5 m with group label **W02**, **W02**, **W02** and **W02** respectively;

Y = -9.0, -5.0, 5.0, 9.0 m with group label **W03**, **W01**, **W01** and **W03** respectively;

Select connect joints with members and Connect joints with plates, input plate group label = **PL1** and Plate name = **A001**.

Main Deck

Grid structure plane = XY, other coordinate Z = 23.0 m;

Joint name of grid origin = 8001, X increment = 4 and Y increment = 1;
Check “Use existing joint if new joint is coincident”

Grid coordinates for main deck:

X = -7.5, -2.5, 2.5, 7.5, 12.5 m with group label **W02, W02, W02, W02** and **W02** respectively;

Y = -9.0, -5.0 5.0 9.0 m with group label **W03, W01, W01** and **W03** respectively;

Select connect joints with members and Connect joints with plates, accept all other default vales.

Save Model.

Define deck member properties;

Member Group W01, Segment 1: W24X162 from AISC,

Member Group W02 and W03, Segment 1: W24X131 from AISC,

Deck member groups defined at this time shall looks like following:

GRUP W01 W24X162	20.00	8.00	24.80	1	1.001.00	0.50	7.849
GRUP W02 W24X131	20.00	8.00	24.80	1	1.001.00	0.50	7.849
GRUP W03 W24X131	20.00	8.00	24.80	1	1.001.00	0.50	7.849

Define deck plate properties;

Plate Group PL1, Plate thickness = 0.8 cm with passions ratio 0.3

Plate group defined shall looks like following:

PGRUP							
PGRUP PL1	0.8000	20.000	0.300	24.800			7.849

Design joints for offsets

Using “Joint” > “Connection” > “Automatic Design”, choose “Offset braces to outside of chord”, use “Move Brace” for “Gapping option”, “Along Chord” for “Brace Move”, set Gap = 5 cm and Gap size option to “Minimum only”, select “Use existing offsets if gap criteria is met”

In joint Can options, select “Update segmented groups can lengths” and set “Can length option” = “API minimum reqts”, and select “Increase joint can lengths only”

Check the generated joint offsets and modified joint can lengths.

The final updated Can length for legs shall look like following:

GRUP	LG1	107.00	3.500	20.00	8.0034.50	1	1.001.00	0.50N 7.8491.95
GRUP	LG1	105.00	2.500	20.00	8.0024.80	1	1.001.00	0.50N 7.849
GRUP	LG1	107.00	3.500	20.00	8.0034.50	1	1.001.00	0.50N 7.8491.66
GRUP	LG2	107.00	3.500	20.00	8.0034.50	1	1.001.00	0.50N 7.8491.98
GRUP	LG2	105.00	2.500	20.00	8.0024.80	1	1.001.00	0.50N 7.849
GRUP	LG2	107.00	3.500	20.00	8.0034.50	1	1.001.00	0.50N 7.8491.44
GRUP	LG3	107.00	3.500	20.00	8.0034.50	1	1.001.00	0.50N 7.8492.07
GRUP	LG3	105.00	2.500	20.00	8.0024.80	1	1.001.00	0.50N 7.849
GRUP	LG3	107.00	3.500	20.00	8.0034.50	1	1.001.00	0.50N 7.8491.44
GRUP	LG4	107.00	3.500	20.00	8.0034.50	1	1.001.00	0.50N 7.849
GRUP	LG5	91.500	2.500	20.00	8.0034.50	1	1.001.00	0.50N 7.849
GRUP	LG6	91.500	2.000	20.00	8.0024.80	1	1.001.00	0.50N 7.8491.00
GRUP	LG6 CONE			20.00	8.0024.80	1	1.001.00	0.50N 7.8491.50
GRUP	LG6	66.000	2.000	20.00	8.0024.80	1	1.001.00	0.50N 7.849
GRUP	LG7	66.000	2.000	20.00	8.0024.80	1	1.001.00	0.50N 7.849

Add deck member offsets;

All **W01** members got global Z offset -31.75 cm; Use “Top of Steel” for offsets,
All **W02** and **W03** members got global Z offset -31.09 cm. Use “Top of Steel” for offsets.

Define Ky/Ly for horizontal framings;

Using “**Property**” > “**K Factor**” > “**Ky**” to modify Ky factor for **H11** members in XY plane Z=-79.50 m and **H21** members in XY plane Z=-50.0 m;

Using “**Property**” > “**Effective Length**” > “**Ly**” to modify Ly factor for **H32** members in XY plane Z=-21.0 m and **H42** members in XY plane Z=2.0 m;

1. Deck Weights

Add cellar deck surface weight ID (CELLWT1) ,

Using “**Seastate**” > “**Global Parameters**” > “**Weight**” > “**Define Surface ID**”, input “**CELLWT1**” for Surface ID, pick joint 7001. 7013 and 7004 for local coordinate joints, input 0.5 for Tolerance, and pick 7001, 7013, 7016 and 7004 by holding CTRL key for Boundary joints, select load direction = “**Local Y**” to add this surface ID definition.

Add main deck surface weight ID (MAINWT1) for deck,

Using “Seastate” > “Global Parameters” > “Weight” > “Define Surface ID”, input “**MAINWT1**” for Surface ID, pick joint 8001, 8017 and 8004 for local coordinate joints, input 0.5 for Tolerance, and pick 8001, 8017, 8020 and 8004 by holding CTRL key for Boundary joints, select load direction = “**Local Y**” to add this surface ID definition.

Add weight group AREA by adding surface weight for deck,

Using “Seastate” > “Global Parameters” > “Weight” > “Surface Weight”, input **AREA** to Weight Group and **AREAWT** to Weight ID, input weight pressure 0.5 kN/m² for cellar deck and select **CELLWT1** for “Selected” Surface IDs”.

Using “Seastate” > “Global Parameters” > “Weight” > “Surface Weight”, select **AREA** to Weight Group and **AREAWT** to Weight ID, input weight pressure 0.75 kN/m² for main deck and select **MAINWT1** for “Selected Surface IDs”.

Add weight group LIVE by adding surface weight,

Add weight group **LIVE**, using surface weight line, main deck weight pressure = 5.0 kN/m² **MAINLIVE** and cellar deck weight pressure = 2.5 kN/m² **CELLLIVE**.

The added surface IDs and surface weights shall look like following:

```
-----
SURFID CELLWT1 LY 7001 7013 7004    0.500
SURFDR 7001 7013 7016 7004
SURFID MAINWT1 LY 8001 8017 8004    0.500
SURFDR 8001 8017 8020 8004
SURFWTAREA 0.500AREAWT          1.001.001.00CELLWT1
SURFWTAREA 0.750AREAWT          1.001.001.00MAINWT1
SURFWTLIVE 2.500CELLLIVE        1.001.001.00CELLWT1
SURFWTLIVE 5.000MAINLIVE        1.001.001.00MAINWT1
-----
```

Add weight group EQPT for footprint weights for deck

Using “Seastate” > “Global Parameters” > “Weight” > “Footprint Weight”,

Main deck, 3 skids,

SKID1: Weight = 1112.05 kN
Footprint center (5.0, 2.0, 23.0)
Relative weight center (0, 0, 3.0)
Skid Length = 6 m
Skid Width = 3 m
2 skid beams in X direction

SKID2: Weight = 667.23 kN
Footprint center (-5.0, -5.0, 23.0)

Relative weight center (0, 0, 2.5)
 Skid Length = 6 m
 Skid Width = 2.5 m
 2 skid beams in X direction

SKID4: Weight = 155.587 kN
 Footprint center (10.0, 6.0, 23.0)
 Relative weight center (0, 0, 4.0)
 Skid Length = 6 m
 Skid Width = 3 m
 3 skid beams in X direction

Cellar deck, 1 skid,

SKID3: Weight = 444.82 kN
 Footprint center (-5.0, 0.0, 15.3)
 Relative weight center (0, 0, 2.0)
 Skid Length = 6 m
 Skid Width = 2.5 m
 2 skid beams in X direction

The added **EQPT** footprint weights shall look like following:

WGTFP EQPT1112.05SKID1	5.000 2.00023.000R	3.000 6.00 3.00 2 0
WGTFP2 1.001.001.000.50L		
WGTFP EQPT667.230SKID2	-5.000-5.00023.000R	2.500 6.00 2.50 2 0
WGTFP2 1.001.001.000.50L		
WGTFP EQPT155.587SKID4	10.000 6.00023.000R	4.000 6.00 3.00 3 0
WGTFP2 1.001.001.000.50L		
WGTFP EQPT444.820SKID3	-5.000 15.300R	2.000 6.00 2.50 2 0
WGTFP2 1.001.001.000.50L		

Add MISC weight group for deck,

WALKWAY weight added to the right most members of both decks, member distributed weight = 2.773 kN/m.

Crane weight added as joint weight = 88.964 kN, add to 807L as **CRANEWT**.

Cellar deck **FIREWALL** weight added as member concentrated weights to 3 upper left Y direction members (705L-7004, 7007-7008, 7011-7012), weight value for each member is 15 kN and distance to beginning joints are 1.5 m.

The **MISC** weights shall look like following:

WGTMEMMISC80178018	2.773	2.7731.001.001.00GLOBUNIF	WALKWAY
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WGTMEMMISC80188019	2.773		2.7731.001.001.00GLOBUNIF	WALKWAY
WGTMEMMISC80198020	2.773		2.7731.001.001.00GLOBUNIF	WALKWAY
WGTMEMMISC7013703L	2.773		2.7731.001.001.00GLOBUNIF	WALKWAY
WGTMEMMISC703L707L	2.773		2.7731.001.001.00GLOBUNIF	WALKWAY
WGTMEMMISC707L7016	2.773		2.7731.001.001.00GLOBUNIF	WALKWAY
WGTJT MISC 88.964CRANEWT 807L			1.0001.0001.000	
WGTMEMMISC705L7004	1.500	15.000	1.001.001.00GLOBCONC	FIREWALL
WGTMEMMISC70077008	1.500	15.000	1.001.001.00GLOBCONC	FIREWALL
WGTMEMMISC70117012	1.500	15.000	1.001.001.00GLOBCONC	FIREWALL

2. Jacket Weights

Add joint weight 2.0 kN with density 7.85 MT/m³ to joint 501L, 503L, 505L and 507L as lifting padeye weights, this weight will be used for pre-service analysis. Weight group label **LPAD** and weight ID **PADEYE**.

Add member distributed weight 1.50 kN/m with density 1.50 MT/m³ to member 405L-407L, 401L-405L, 401L-403L and 403L-407L as jacket walkways and handrails. Weight group label **WKWY** and weight ID **WALKWAY**.

Using “Seastate” > “Global Parameters” > “Weight” > “Anode Weight”, anode of 2.5 kN with 2 anodes per member will be added to the whole jacket except members on top framing and above. Material weight density = 2.723 MT/m³, weight group label **ANOD** and weight ID **ANODE**.

Part of jacket weights shall look like following:

WGTMEMANOD103L201L	11.862	2.500		1.001.001.00GLOBCONC	2.723ANODE
WGTMEMANOD103L201L	23.724	2.500		1.001.001.00GLOBCONC	2.723ANODE
WGTMEMANOD105L1002	3.713	2.500		1.001.001.00GLOBCONC	2.723ANODE
...					
...					
...					
WGTMEMANOD305L401L	7.991	2.500		1.001.001.00GLOBCONC	2.723ANODE
WGTMEMANOD305L401L	15.982	2.500		1.001.001.00GLOBCONC	2.723ANODE
WGTMEMANOD305L405L	7.705	2.500		1.001.001.00GLOBCONC	2.723ANODE
WGTMEMANOD305L405L	15.410	2.500		1.001.001.00GLOBCONC	2.723ANODE
WGTJT LPAD 2.000PADEYE	501L	7.850		1.0001.0001.000	
WGTJT LPAD 2.000PADEYE	503L	7.850		1.0001.0001.000	
WGTJT LPAD 2.000PADEYE	505L	7.850		1.0001.0001.000	
WGTJT LPAD 2.000PADEYE	507L	7.850		1.0001.0001.000	
WGTMEMWKWY401L405L		1.500		1.5001.001.001.00GLOBUNIF	1.500WALKWAY
WGTMEMWKWY403L407L		1.500		1.5001.001.001.00GLOBUNIF	1.500WALKWAY
WGTMEMWKWY405L407L		1.500		1.5001.001.001.00GLOBUNIF	1.500WALKWAY
WGTMEMWKWY401L403L		1.500		1.5001.001.001.00GLOBUNIF	1.500WALKWAY

3. Loads

Inertia loads from various weights defined on deck structure, using 1.0 G acceleration in Z direction. A **CENTER** line defining Center ID **CEN1** shall be added right after joint definitions to define roll center for inertia load generations.

Load condition **AREA**, **EQPT**, **LIVE**, and **MISC** will be created. Each load condition will contain a weight selection (**INCWGT**) line and acceleration line (**ACCEL**).

Weights defined on jacket will be added to the environmental load conditions for accounting of possible buoyancy and possible wave loads.

The added inertia load cases shall look like following:

```

-----
LOADCNAREA
INCWGT  AREA
ACCEL           1.00000                      N  CEN1
LOADCNEQPT
INCWGT  EQPT
ACCEL           1.00000                      N  CEN1
LOADCNLIVE
INCWGT  LIVE
ACCEL           1.00000                      N  CEN1
LOADCNMISC
INCWGT  MISC
ACCEL           1.00000                      N  CEN1
-----

```

4. Environmental Loading

Before adding environmental loading, following items shall be added first,

Cd and Cm for wave force calculation using **CDM** line,
Cd and Cm, for tubular member diameter from 2.5 cm to 250 cm, Cd=0.6 and Cm=1.2 for both clean and fouled members.

The added drag and inertia coefficient lines shall look like following:

```

-----
CDM
CDM      2.50 0.600      1.200      0.600      1.200
CDM     250.00 0.600      1.200      0.600      1.200
-----

```

Marine growth shall be overridden using **MGROV** line,
Marine growth: From 0.0 to 60 m, thickness 2.5 cm and from 60 to 79.5 m, thickness 5.0 cm with dry weight 1.4 t/m³.

The added marine growth override lines shall look like following:

```

-----
MGROV
MGROV      0.000 60.000  2.500      1.400
MGROV     60.000 79.500  5.000      1.400
-----

```

Jacket leg members shall be override for flooding. Leg groups from **LG1** to **LG4** shall be override as flooding members

The added Member group override lines shall looks like following:

```

GRPOV
GRPOV      LG1  F
GRPOV      LG1  F
GRPOV      LG1  F
GRPOV      LG2  F
GRPOV      LG2  F
GRPOV      LG2  F
GRPOV      LG3  F
GRPOV      LG3  F
GRPOV      LG3  F
GRPOV      LG4  F
GRPOV      W.BNF 0.001  0.001  0.001 0.001 0.001
GRPOV      PL1NN          0.001 0.001 0.001
GRPOV      PL2NN          0.001 0.001 0.001
GRPOV      PL3NN          0.001 0.001 0.001
GRPOV      PL4NN          0.001 0.001 0.001

```

Operating Storm (three directions considered: 0.00, 45.00, 90.00), load case **P000, P045, P090**,

Jacket weight groups **ANOD** and **WKWY** will be selected using **INCWGT** line to account for weight, buoyancy and wave/current loads.

Wind: 25.72 m/sec, AP08 profile;

Current: 0.514 m/sec @ 0.00 m (Mudline), automatic blocking factor will be calculated at - 5.0 m; linear current stretch will be selected and apparent wave period will be determined.

Current: 1.029 m/sec @ 79.5 m (surface)

Wave: 6.1 m @ 12.00 sec, stream function 7th order for 18 steps, critical position = Maximum Base Shear.

Dead load and buoyancy accounted using **DEAD** line.

The 3 operating storm load case lines shall looks like following:

```

LOADCNP000
INCWGT  ANODWKWY
WIND
WIND      25.72          0.0          AP08
CURR
CURR      0.000  0.514  0.000          -5.000BC LN          AWP
CURR      79.500  1.029  0.000
WAVE
WAVE      STRE  6.10          12.00          0.00  D  0.00  20.00  18MS10 1 0 7
DEAD
DEAD      -Z                      M
LOADCNP045

```

```

INCWGT  ANODWKWY
WIND
WIND      25.72      45.00      AP08
CURR
CURR      0.000    0.514  45.000      -5.000BC LN      AWP
CURR      79.500    1.029  45.000
WAVE
WAVE  STRE  6.10      12.00      45.00      D    0.00  20.00  18MS10 1 0 7
DEAD
DEAD      -Z      M
LOADCNP090
INCWGT  ANODWKWY
WIND
WIND      25.72      90.00      AP08
CURR
CURR      0.000    0.514  90.000      -5.000BC LN      AWP
CURR      79.500    1.029  90.000
WAVE
WAVE  STRE  6.10      12.00      90.00      D    0.00  20.00  18MS10 1 0 7
DEAD
DEAD      -Z      M

```

Extreme Storm (three directions considered: 0.00, 45.00, 90.00), load case **S000**, **S045**, **S090**,

Jacket weight groups **ANOD** and **WKWY** will be selected using **INCWGT** line to account for weight, buoyancy and wave/current loads.

Water depth needs corrected to 81.00 m

Wind: 45.17 m/sec, AP08 profile

Current: 0.514 m/sec @ 0.00 m (mudline) , automatic blocking factor will be calculated at - 5.0 m; linear current stretch will be selected and apparent wave period will be determined.

Current: 1.801 m/sec @ 81.0 m (surface)

Wave: 12.19 m @ 15.00 sec, stream function 7th order for 18 steps, critical position = Maximum Base Shear.

Dead load and buoyancy accounted using **DEAD** line.

The 3 extreme storm load case lines shall look like following:

```

LOADCNS000
INCWGT  ANODWKWY
WIND
WIND      45.17      0.0    81.00AP08
CURR
CURR      0.000    0.514    0.000      -5.000BC LN      AWP
CURR      81.000    1.801    0.000
WAVE
WAVE  STRE 12.19 81.00 15.00      0.00      D    0.00  20.00  18MS10 1 0 7
DEAD
DEAD      -Z      M
LOADCNS045
INCWGT  ANODWKWY
WIND
WIND      45.17      40.00   81.00AP08
CURR
CURR      0.000    0.514  45.000      -5.000BC LN      AWP
CURR      81.000    1.801  45.000

```

```

WAVE
WAVE      STRE 12.19 81.00 15.00          45.00      D   0.00 20.00 18MS10 1 0 7
DEAD
DEAD      -Z                                  M
LOADCNS090
INCWGT  ANODWKWY
WIND
WIND      45.17          90.00   81.00AP08
CURR
CURR      0.000   0.514  90.000          -5.000BC LN      AWP
CURR      81.000   1.801  90.000
WAVE
WAVE      STRE 12.19 81.00 15.00          90.00      D   0.00 20.00 18MS10 1 0 7
DEAD
DEAD      -Z                                  M

```

Modify **LDOPT** for water depth = 79.50 m and mudline elevation = -79.50 m

Modify **OPTIONS** line to include code check options and report selections.

The option lines including title line shall look like following:

```

-----
LDOPT      NF+Z   1.025   7.85  -79.50   79.50   MN              NPNP   K
TEST MODEL WITH WEIGHT CAPABILITIES
OPTIONS      MN      SDUC   2 1          PTPT      PTPT
-----

```

Note: For surface weight and footprint, check the weight summary for contact member reports is very important, otherwise, the weight may not convert to member loads as expected.

5. Load combinations

Six load combinations **OPR1**, **OPR2**, **OPR3**, **STM1**, **STM2** and **STM3** will be added to the model, three corresponding to operating storm and three corresponding to extreme storm, load factors for environmental loads of 1.1 will be used. Live load will be factored to 0.75 in extreme storm load combinations.

The load combination lines shall look like following:

```

-----
LCOMB
LCOMB OPR1 AREA 1.000EQPT 1.000LIVE 1.000MISC 1.000P000 1.100
LCOMB OPR2 AREA 1.000EQPT 1.000LIVE 1.000MISC 1.000P045 1.100
LCOMB OPR3 AREA 1.000EQPT 1.000LIVE 1.000MISC 1.000P090 1.100
LCOMB STM1 AREA 1.000EQPT 1.000LIVE0.7500MISC 1.000S000 1.100
LCOMB STM2 AREA 1.000EQPT 1.000LIVE0.7500MISC 1.000S045 1.100
LCOMB STM3 AREA 1.000EQPT 1.000LIVE0.7500MISC 1.000S090 1.100
-----

```

Load case selection for reporting shall be added (**LCSEL**) to selected six load combinations;

Material strength modifier for 3 extreme storm load combinations will be added (**AMOD** =1.333)

Add unity check partition line (**UCPART**).

The **LCSEL**, **UCPART** and **AMOD** lines shall look like following:

```
-----  
LCSEL          OPR1 OPR2 OPR3 STM1 STM2 STM3  
UCPART        0.00 0.50 0.50 1.00 1.00300.0  
AMOD  
AMOD   STM1 1.333STM2 1.333STM3 1.333  
-----
```

Run SEASTATE to see if any errors occurred during load generation;

The expected Seastate results are shown in next page.

The weight group summary report:

***** ADDITIONAL WEIGHT SUMMARY *****								
WEIGHT NO.	GROUP ID	TOTAL	*** CENTER OF GRAVITY ***			***** DIRECTIONAL WEIGHTS *****		
		WEIGHT	X	Y	Z	X	Y	Z
		KN	M	M	M	KN	KN	KN
1	AREA	405.00	1.67	0.00	20.43	405.00	405.00	405.00
2	EQPT	2379.69	0.65	-0.08	24.30	2379.69	2379.69	2379.69
3	LIVE	2474.99	1.82	0.00	20.90	2474.99	2474.99	2474.99
4	MISC	233.79	6.64	3.15	19.68	233.79	233.79	233.79
5	ANOD	280.00	2.54	0.04	-46.41	280.00	280.00	280.00
6	LPAD	8.00	0.05	0.00	3.00	8.00	8.00	8.00
7	WKWY	70.36	0.10	0.00	2.00	70.36	70.36	70.36

The Seastate basic load case summary report:

***** SEASTATE BASIC LOAD CASE SUMMARY *****									
RELATIVE TO MUDLINE ELEVATION									
LOAD CASE	LOAD LABEL	FX	FY	FZ	MX	MY	MZ	DEAD LOAD	BUOYANCY
		(KN)	(KN)	(KN)	(KN-M)	(KN-M)	(KN-M)	(KN)	(KN)
1	AREA	0.000	0.000	-404.997	-0.009	661.497	0.000	0.000	0.000
2	EQPT	0.000	0.000	-2379.693	178.529	1555.874	0.000	0.000	0.000
3	LIVE	0.000	0.000	-2474.985	-0.055	4409.977	0.000	0.000	0.000
4	MISC	0.000	0.000	-233.792	-737.322	1553.012	0.000	0.000	0.000
5	P000	630.253	-0.535	-5473.817	-37.559	48470.852	-15.500	8601.126	3095.674
6	P045	446.812	462.073	-5469.212	-27742.811	37496.418	623.830	8601.126	3095.384
7	P090	-3.920	666.770	-5489.886	-40396.238	10633.022	908.580	8601.126	3097.122
8	S000	2035.183	0.708	-5303.598	-179.060	130797.672	-55.730	8601.125	3149.045
9	S045	1461.540	1461.805	-5290.319	-86087.164	97586.547	1993.007	8601.125	3149.389
10	S090	2.011	2129.499	-5358.792	-126743.961	11017.531	3029.251	8601.125	3149.437

The Seastate combined load case summary report:

***** SEASTATE COMBINED LOAD CASE SUMMARY *****							
RELATIVE TO MUDLINE ELEVATION							
LOAD CASE	LOAD LABEL	FX	FY	FZ	MX	MY	MZ
		(KN)	(KN)	(KN)	(KN-M)	(KN-M)	(KN-M)
11	OPR1	693.279	-0.589	-11514.667	-600.172	61498.297	-17.050
12	OPR2	491.493	508.280	-11509.602	-31075.949	49426.418	686.212
13	OPR3	-4.312	733.447	-11532.343	-44994.719	19876.684	999.438
14	STM1	2238.702	0.779	-10708.680	-755.809	150955.297	-61.303
15	STM2	1607.694	1607.985	-10694.073	-95254.727	114423.062	2192.308
16	STM3	2.212	2342.448	-10769.394	-139977.203	19197.148	3332.176