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AN INTERNET BASED USER ACCESSED PROGRAM FOR CALCULATING COMPLEX PIPELINES AND CATENARY RISERS IN DEEP AND ULTRA-DEEP WATER

This is a sample of worksheet 1 of the results workbook: other 6 worksheets (not displayed here) show complete numerical and graphical analysis.

INPUT DATA

RING 1 (OR ONLY PIPE)

OUTER DIAMETER	12.75	IN	323.85	mm
WALL THICKNESS	0.80	IN	20.32	mm
YIELD STRENGTH	65,000	P.S.I.	448	MPa
MODULUS OF ELASTICITY	29,000,000	P.S.I.	199,958	MPa
SPECIFIC WEIGHT	0.283	LB/CU IN	7.834	kg/m3

RING 2

OUTER DIAMETER	12.91	IN	327.91	mm
WALL THICKNESS	0.08	IN	2.03	mm
YIELD STRENGTH	7,250	P.S.I.	50	MPa
MODULUS OF ELASTICITY	250,000	P.S.I.	1,724	MPa
SPECIFIC WEIGHT	0.036	LB/CU IN	996	kg/m3

RING 3

OUTER DIAMETER	13.00	IN	330.20	mm
WALL THICKNESS	0.05	IN	1.14	mm
YIELD STRENGTH	7,150	P.S.I.	49	MPa
MODULUS OF ELASTICITY	250,000	P.S.I.	1,724	MPa
SPECIFIC WEIGHT	0.042	LB/CU IN	1,163	kg/m3

RING 4

OUTER DIAMETER	17.00	IN	431.80	mm
WALL THICKNESS	2.00	IN	50.80	mm
YIELD STRENGTH	6,350	P.S.I.	44	MPa
MODULUS OF ELASTICITY	350,000	P.S.I.	2,413	MPa
SPECIFIC WEIGHT	0.02	LB/CU IN	554	kg/m3

RING 5

OUTER DIAMETER	18.00	IN	457.20	mm
WALL THICKNESS	0.50	IN	12.70	mm
YIELD STRENGTH	65,000	P.S.I.	448	MPa
MODULUS OF ELASTICITY	29,000,000	P.S.I.	199,958	MPa
SPECIFIC WEIGHT	0.283	LB/CU IN	7.834	kg/m3

RING 6

OUTER DIAMETER	18.20	IN	462.28	mm
WALL THICKNESS	0.10	IN	2.54	mm
YIELD STRENGTH	7,250	P.S.I.	50	MPa
MODULUS OF ELASTICITY	250,000	P.S.I.	1,724	MPa
SPECIFIC WEIGHT	0.04	LB/CU IN	1,107	kg/m3

RING 7

OUTER DIAMETER	18.20	IN	462.28	mm
WALL THICKNESS	0.00	IN	0.00	mm
YIELD STRENGTH	0	P.S.I.	0	MPa
MODULUS OF ELASTICITY	0	P.S.I.	0	MPa
SPECIFIC WEIGHT	0	LB/CU IN	0	kg/m3

WATER DEPTH	10,000	FEET	3,048	m
IS PIPE DRY OR FLOODED	DRY		DRY	
HANG-OFF POINT COMBINED HEAVE EXCURSION	19.83	FEET	6.04	m
HANG-OFF POINT COMBINED HEAVE PERIOD	8.80	SEC.	8.80	sec.
TARGET STRAIN	0.15	%	0.15	%

RESULTS OF CALCULATIONS

MAXIMUM STRAIN	0.150%		0.150%	
MAXIMUM BENDING STRESS	42,036	P.S.I.	290	MPa
MAXIMUM TENSILE PLUS BENDING STRESS	43,516	P.S.I.	300	MPa
MAXIMUM HOOP STRESS (EMPTY INNER PIPE)	35,410	P.S.I.	244	MPa
MINIMUM SAFETY FACTOR ON YIELD	1.49	/1	1.49	/1
DISTANCE TO TOUCHDOWN POINT FROM VESSEL	1,753.00	FT.	534.31	m
HORIZONTAL DISTANCE TO TOUCHDOWN FROM POINT OF MAXIMUM BENDING STRESS	208.33	FT.	63.50	m
HEIGHT OF POINT OF MAXIMUM BENDING STRESS ABOVE TOUCHDOWN POINT	24.98	FT.	7.62	m
ANGLE OF PIPELINE AT VESSEL (FROM VERTICAL)	2.70	DEG.	2.70	DEG.
ACTUAL HORIZONTAL THRUST REQUIRED	44,761	LBS.	199,178	N
APPROXIMATE THRUST POWER REQUIRED	1,989	HP	1,464	kW
VERTICAL LOAD OF PIPELINE ON VESSEL	1,131,104	LBS.	5,033,205	N
MAXIMUM COMBINED DYNAMIC STRESS VARIATION AS A % OF YIELD STRENGTH	16.67%	% OF YIELD	16.67%	
MAXIMUM DYNAMIC STRESS VARIATION	10,838	P.S.I.	75	MPa
MAXIMUM STRESS AFTER ACCIDENTAL FLOODING	46,491	P.S.I.	321	MPa
ACTUAL HORIZONTAL THRUST REQUIRED AFTER FLOODING	65,818	LBS.	292,879	N
VERTICAL LOAD OF PIPELINE ON VESSEL AFTER FLOODING	1,734,112	LBS.	7,716,481	N

FOLLOWING TABS IN THIS WORKBOOK INCLUDE INFORMATION ON:

- STATIC GRAPHICS
- DYNAMIC GRAPHICS
- FLOODING GRAPHICS
- STATIC DATA
- DYNAMIC DATA
- FLOODING DATA

WHEREAS THE RESULTS OF THESE CALCULATIONS HAVE BEEN HIGHLY REFINED AND ARE UNDERSTOOD TO BE HIGHLY ACCURATE, THE USE OF THIS PROGRAM DOES NOT IMPLY ANY LIABILITY AS TO THE USE OF THE RESULTS

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