Pipeline Crossing Simulation Report

Project Title:	Untitled Project (Initial)
Report Date:	June 13, 2025 12:30:55
Generated By:	Guest User
Verified By:	_____

1. Input Parameters

Parameter	Value	Unit
Pipe Outside Diameter D	1016.0	mm
Pipe Wall Thickness t	10.0	mm
Specified Minimum Yield Strength SMYS	195.0	MPa
Depth of Cover H	1.5	m
Corrosion Allowance CA	0.0	mm
Operating Pressure p	0.0	MPa
Operating Temperature T2	40.0	°C
Impact Factor Fi	1.5	-
Design Wheel Load (Single Axle) Ps	53.4	kN
Soil Unit Weight γ	18.9	kN/m³
Design Factor F	0.72	-
Design Wheel Load (Tandem Axle) Pt	44.5	kN
Modulus of Soil Reaction E'	3.4	MPa
Longitudinal Joint Factor E	1.0	-
Young's Modulus Es	210000.0	MPa
Resilient Modulus Er	34.0	MPa
Installation Temperature T1	65.0	°C
Poisson's Ratio μ	0.3	-
Coeff. of Thermal Expansion αT	1.44e-05	/°C
Earth Load Stiffness Factor KHe	6330.0	-
Earth Load Burial Factor Be	0.47	-
Earth Load Excavation Factor Ee	0.91	-
Stiffness Factor KHh	19.8	-
Geometry Factor GHh	0.7	-
Stiffness Factor KLh	14.8	-
Geometry Factor GLh	0.64	-

Road Axle Configuration Factor L	1.0	-
Road Pavement Type Factor R	1.0	-
Fatigue Endurance (Girth weld) SFG	82.737	MPa
Fatigue Endurance (Long. Weld) SFL	158.57	MPa
Pipe Type	N/A	-
Bored Diameter Option	N/A	-
Soil Type	N/A	-
Steel Grade	Fe 330	-
Codes & Standards	N/A	-

2. Calculation Results

Output Parameter	Value	Unit
Pipe Wall Thickness (incl. CA) tw	10.000	mm
Bored Diameter Bd	1016.000	mm
Barlow Stress SHi	0.000	MPa
Stress due to Earth Load SHe	51.987	MPa
Cyclic Circumferential Stress ΔSHh	9.938	MPa
Cyclic Longitudinal Stress ΔSLh	6.791	MPa
Radial Stress S3	0.000	MPa
Circumferential Stress S1	61.925	MPa
Longitudinal Stress S2	97.987	MPa
Effective Stress Seff	85.839	MPa

3. Ratio Check

Barlow Stress Check

Barlow Stress SHi	F.E. SMYS	Ratio < 1	Result
0.000	140.400	0.000	Allowable

Principal Stress Criteria Check

Effective Stress Seff	SMYS * D.F.	Ratio < 1	Result
85.839	140.400	0.611	Allowable

Fatigue Check

Girth Weld Criteria Check

Cyclic Long. Stress ΔSLh	Fatigue Girth x D.F.	Ratio < 1	Result
6.791	59.571	0.114	Allowable

Longitudinal Weld Criteria Check

Cyclic Circ. Stress ΔSHh	Fatigue Long x D.F.	Ratio < 1	Result
9.938	114.170	0.087	Allowable