

Auger Bore Thrust & Stresses Report

Method A: Standard Auger Bore

PROJECT NAME

Demo - Case #1

CLIENT

ABC Pipeline

CALCULATED BY

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DATE

June 29, 2026

AUGER BORE THRUST & STRESSES

Method A: Standard Auger Bore - Pipe Jacked Through Virgin Soil

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1. EXECUTIVE SUMMARY

TOTAL JACKING FORCE (Factored)

643,008 lbs

Unfactored: 584,552 lbs | Utilization: 93.3%

Pipe Properties

OD:	16.000 in
Wall Thickness:	0.375 in
Grade:	X-52
SMYS:	52,000 psi
Design Factor:	0.72
ID:	15.250 in
Steel Area:	18.408 in ²
Moment of Inertia:	562.08 in ⁴
Pipe Weight:	62.58 lb/ft

Bore Geometry

Bore Length:	250 ft
Depth of Cover:	12.0 ft
Bore Overcut:	0.50 in
Grade Angle:	0.0 deg

Soil & Friction

Soil Unit Weight:	120 pcf
Soil Friction Angle:	25 deg
Cohesion:	500 psf
Lubricated:	No
Effective Friction:	0.30

Design Parameters

Safety Factor (k):	1.1
Allowable Stress:	37,440 psi
Face Pressure:	5.0 psi

2. CALCULATION DETAILS

Earth Pressure (Soil Column Theory)

Parameter	Value	Unit
Active Earth Pressure Coeff (K_a)	0.4059	-
Vertical Pressure at Crown (q_v)	1,360	psf
Vertical Pressure at CL ($q_{v,cl}$)	1,440	psf
Horizontal Pressure at CL (q_h)	584.4	psf
Base Reaction (q_r)	1566.9	psf
Average Normal Stress (σ_{avg})	1024.0	psf

Force Analysis

Force Component	Value (lbs)	Value (kN)
Frictional Resistance (F_f)	321,684	1430.9
Frontal Resistance (N_F)	1,069	4.8
Gravity Component (F_g)	0	0.0
Total Jacking Force (F_0)	584,552	2600.2
Factored Force ($k \times F_0$)	643,008	2860.2

Pipe Stress Check

Parameter	Value	Status
Axial Stress - Unfactored	31,756 psi	-
Axial Stress - Factored	34,931 psi	-
Allowable Compressive Stress	37,440 psi	-
Utilization Ratio	0.933	PASS

3. CONCLUSIONS AND RECOMMENDATIONS

Design Verification

The pipe stress utilization ratio is 0.933 (< 1.0) - PASS

Factored jacking force: 643,008 lbs

The pipe section is adequate for the applied jacking loads

Construction Recommendations

1. Verify pipe material meets Grade X-52 through MTRs
2. Monitor jacking force during installation; compare to predicted values
3. If lubrication is specified, ensure bentonite system is operational before push
4. Verify depth of cover matches design assumption (12.0 ft)
5. Document as-built conditions and actual jacking forces for records

References: ASCE/CI 36-15 — Standard Design and Construction Guidelines for Microtunneling; ASCE MOP 106 — Horizontal Auger Boring Projects; DWA-A 161 — Static Calculation of Jacking Pipes; 49 CFR 192 — US DOT Gas Pipeline Safety Regulation