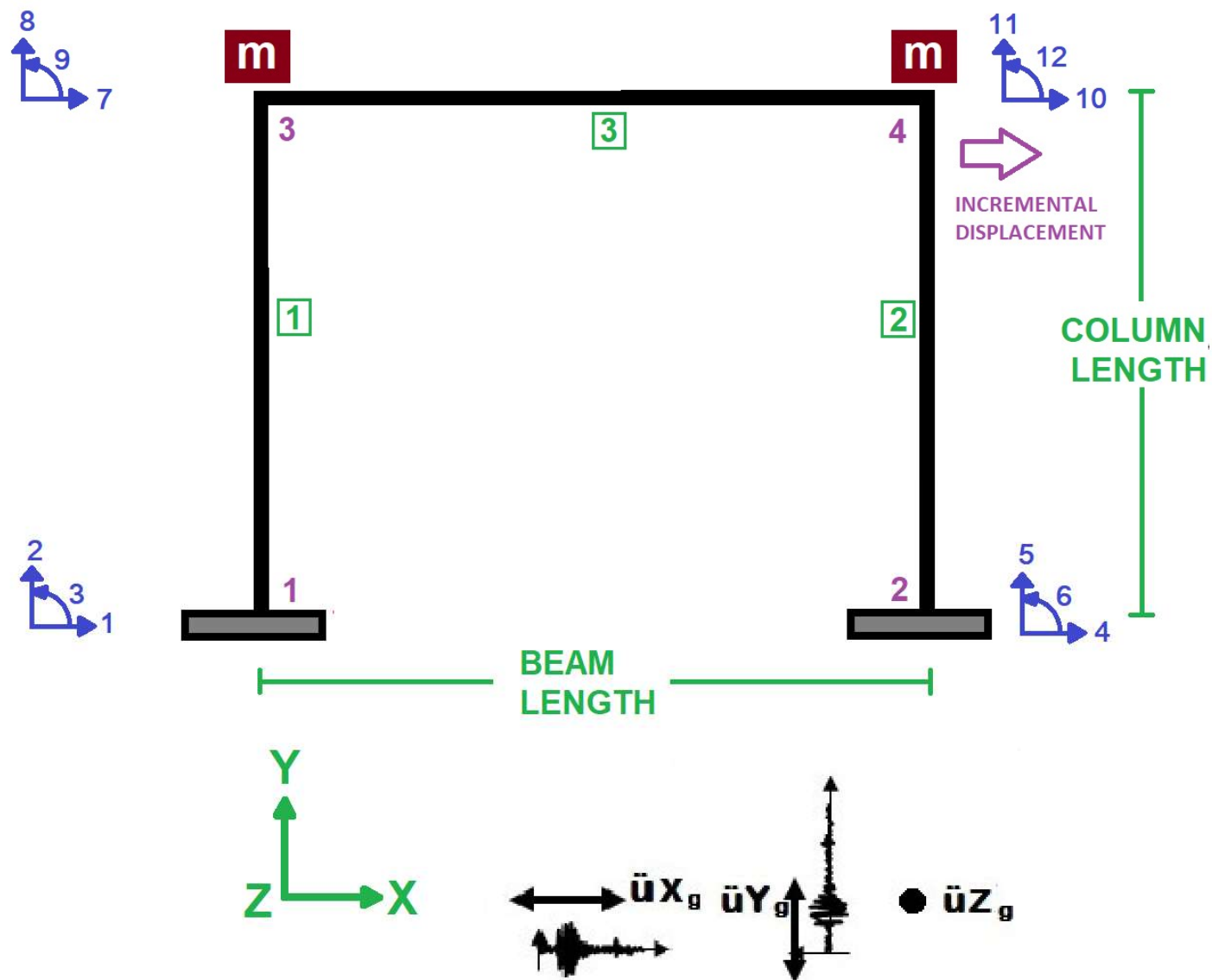


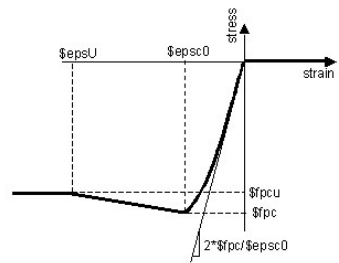
IN THE NAME OF ALLAH, THE MOST GRACIOUS, THE MOST MERCIFUL

# **CONCRETE COLUMN SECTION REBAR OPTIMIZATION BASED ON DEMAND BASE-SHEAR REACTION.**

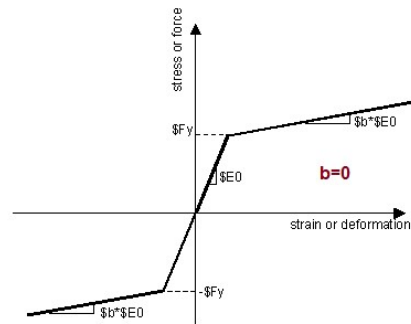
**UTILIZING PARALLEL PROCESSING PROCEDURES  
FOR THE SIMULTANEOUS EXECUTION OF  
NONLINEAR STATIC AND DYNAMIC CONCRETE  
STRUCTURAL ANALYSIS, USING OPENSEES**

WRITTEN BY SALAR DELAVAR GHASHGHAEI (QASHQAI)

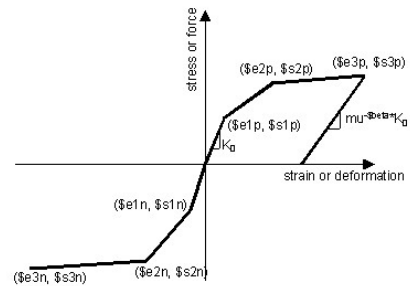




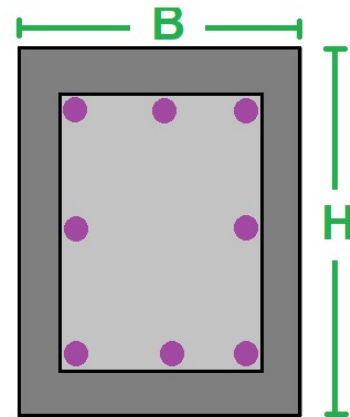
CORE AND COVER CONCRETE REALTION



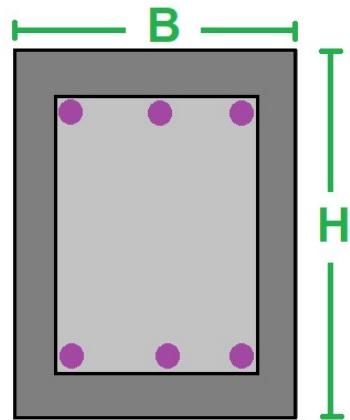
WITHOUT HARDENING AND ULTIMATE STRAIN



WITH HARDENING AND ULTIMATE STRAIN

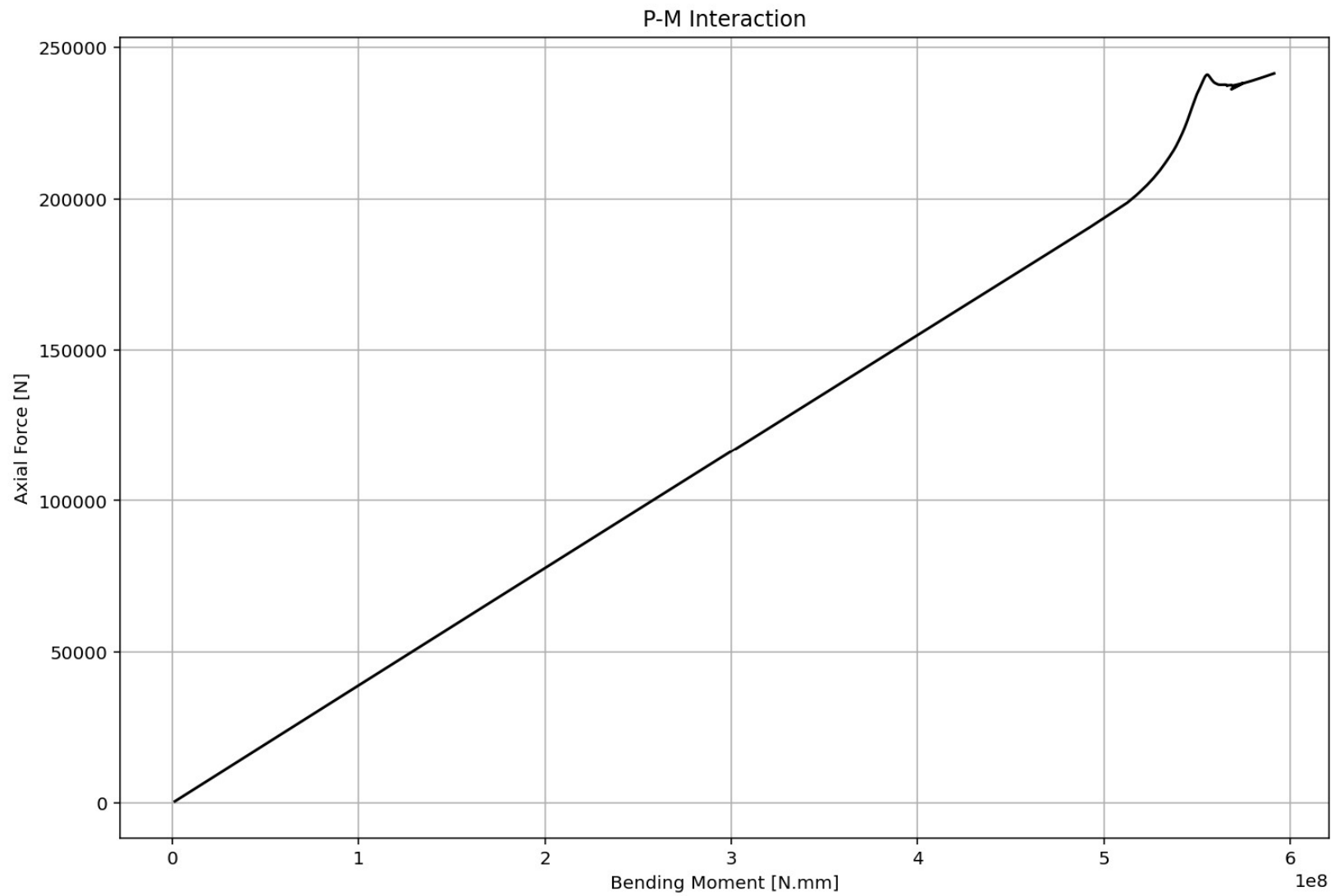


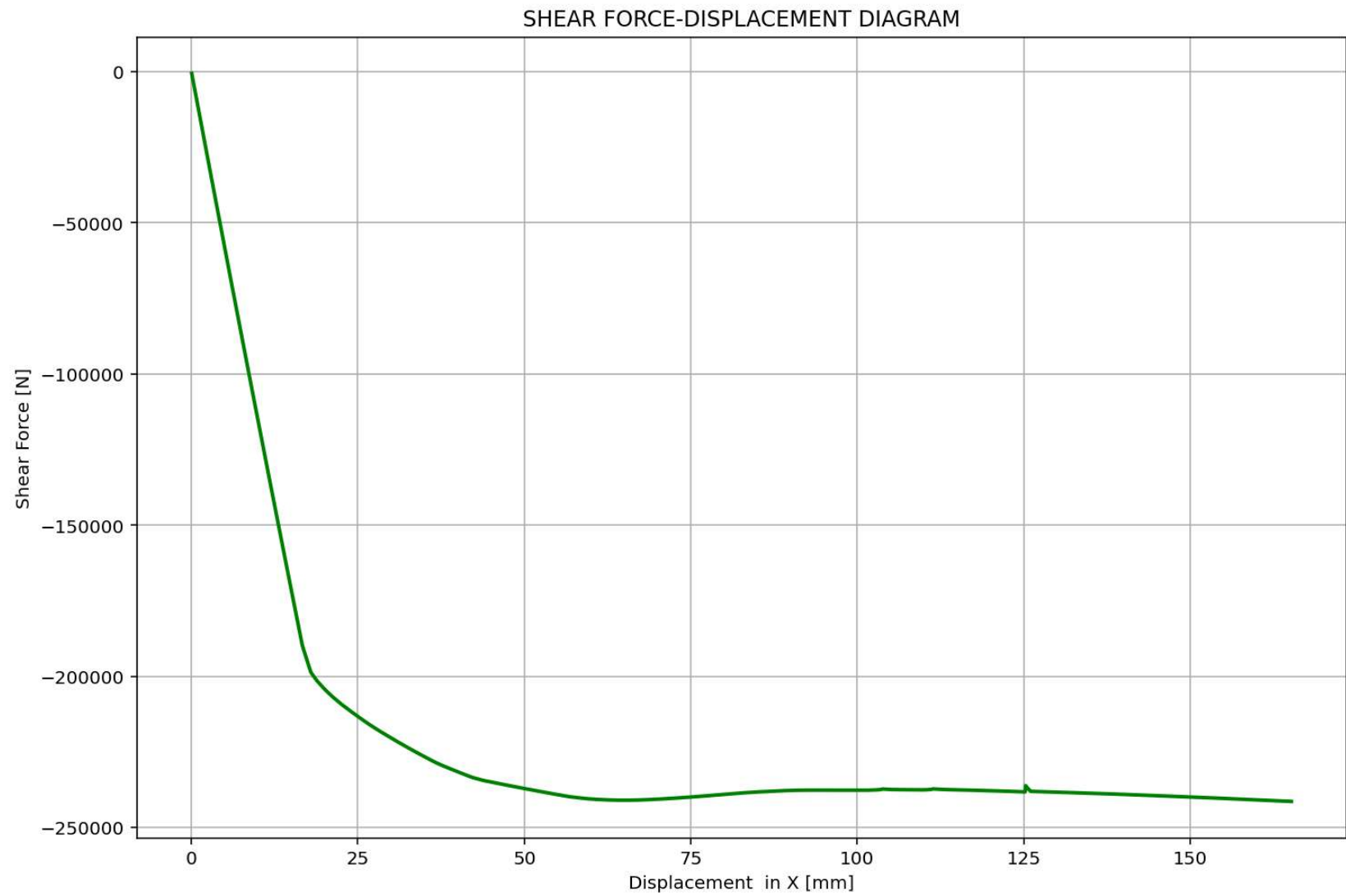
COLUMN SECTION

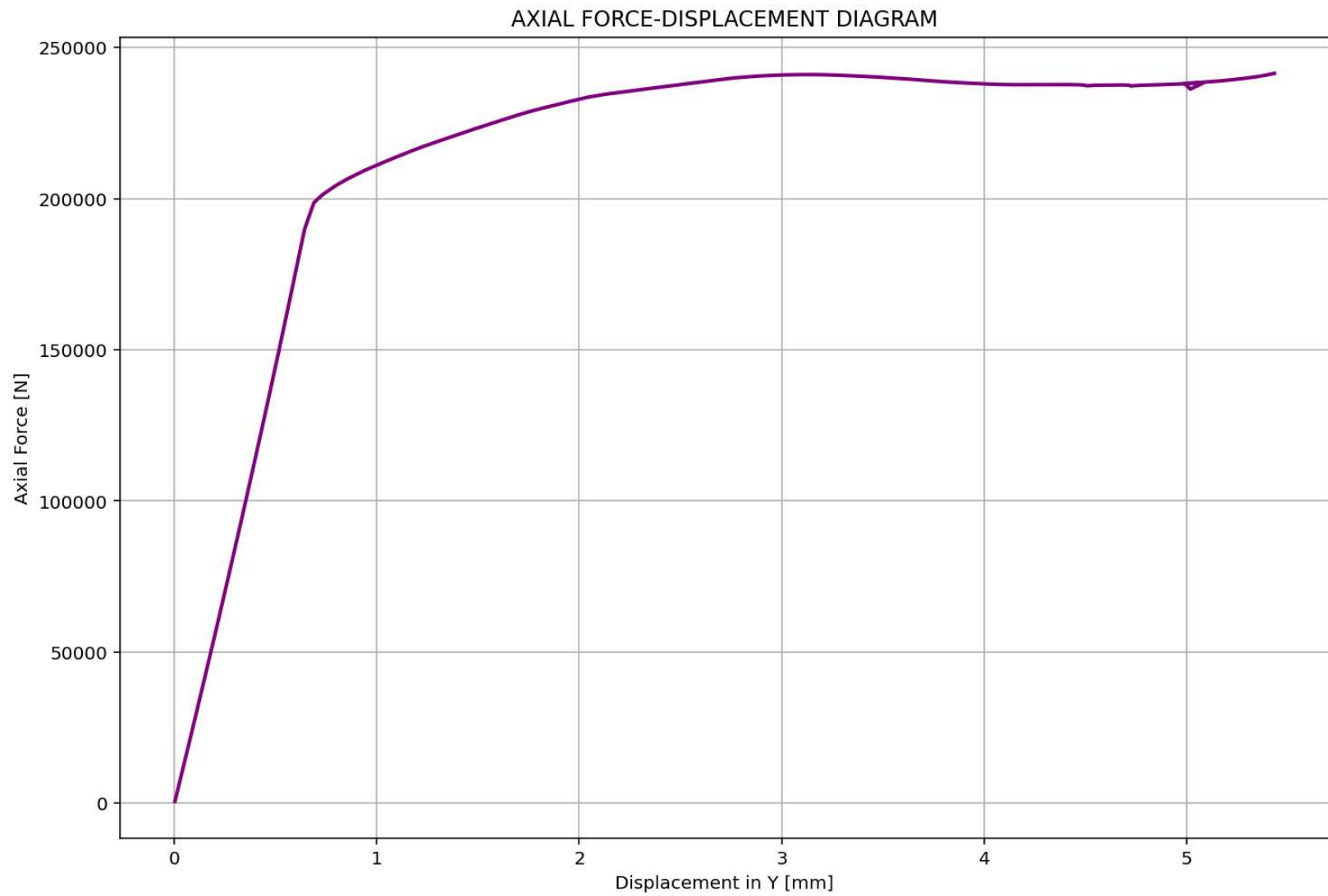


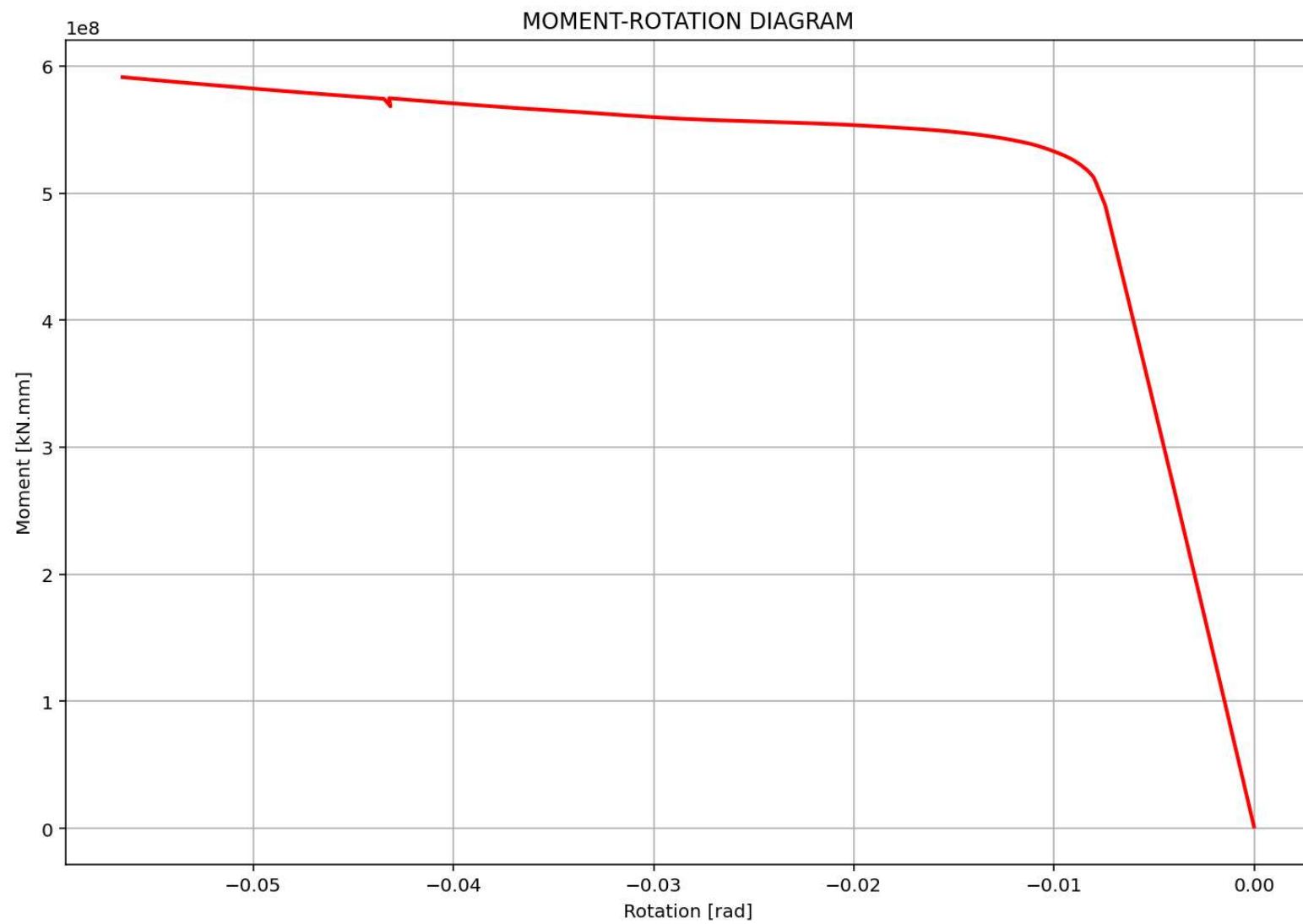
BEAM SECTION

# **NONLINEAR STATIC ANALYSIS (PUSHOVER)**



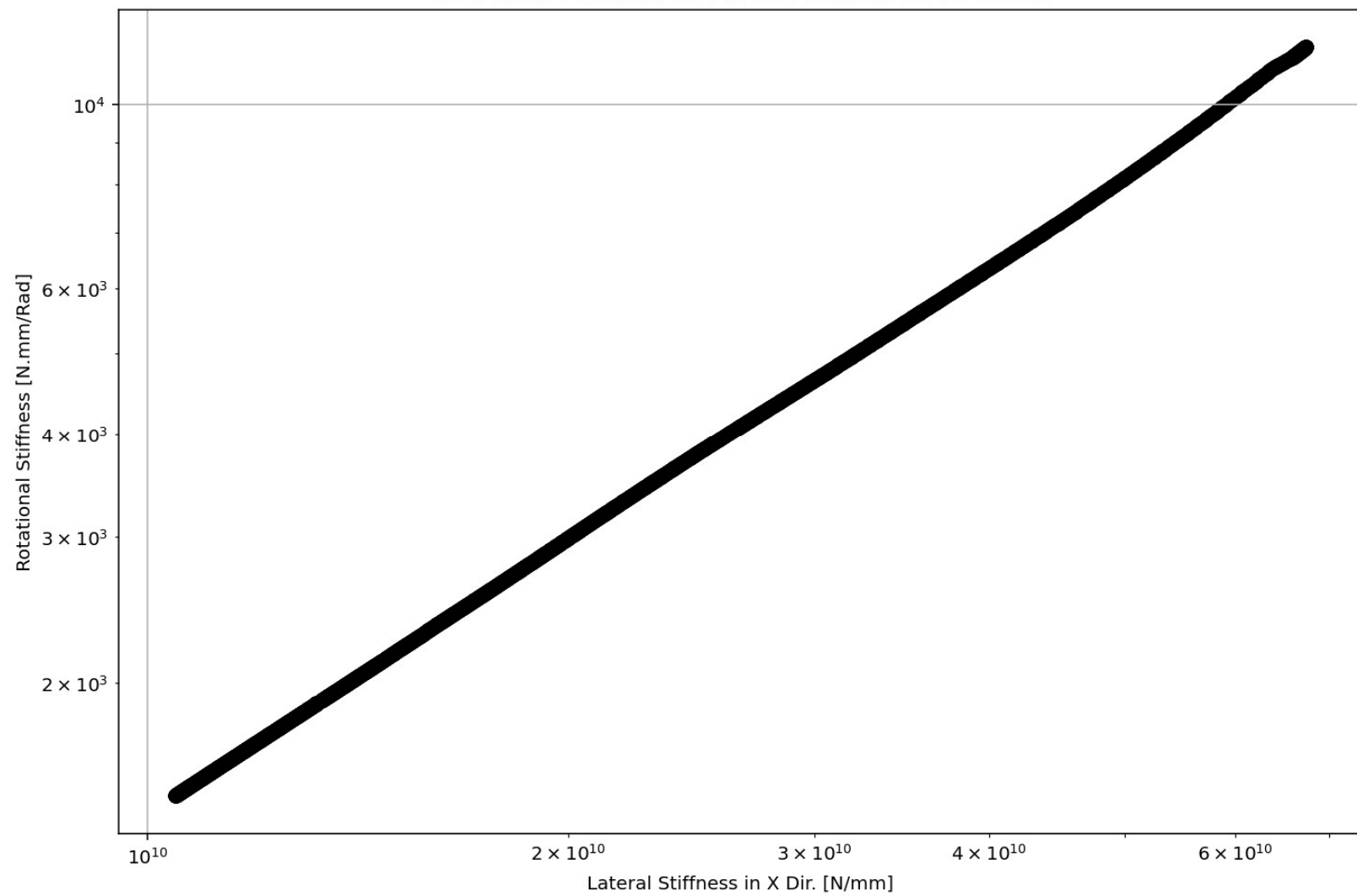




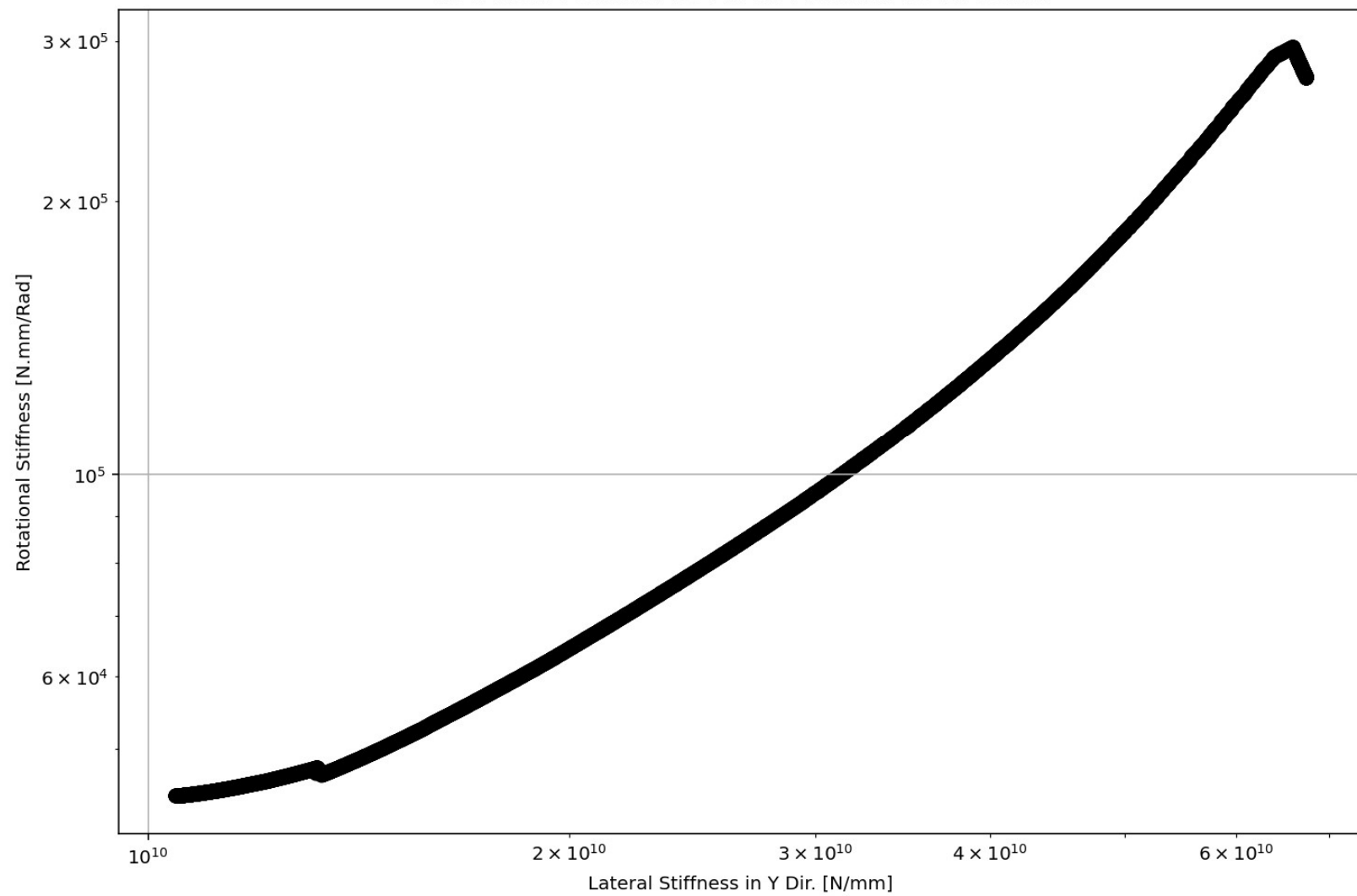


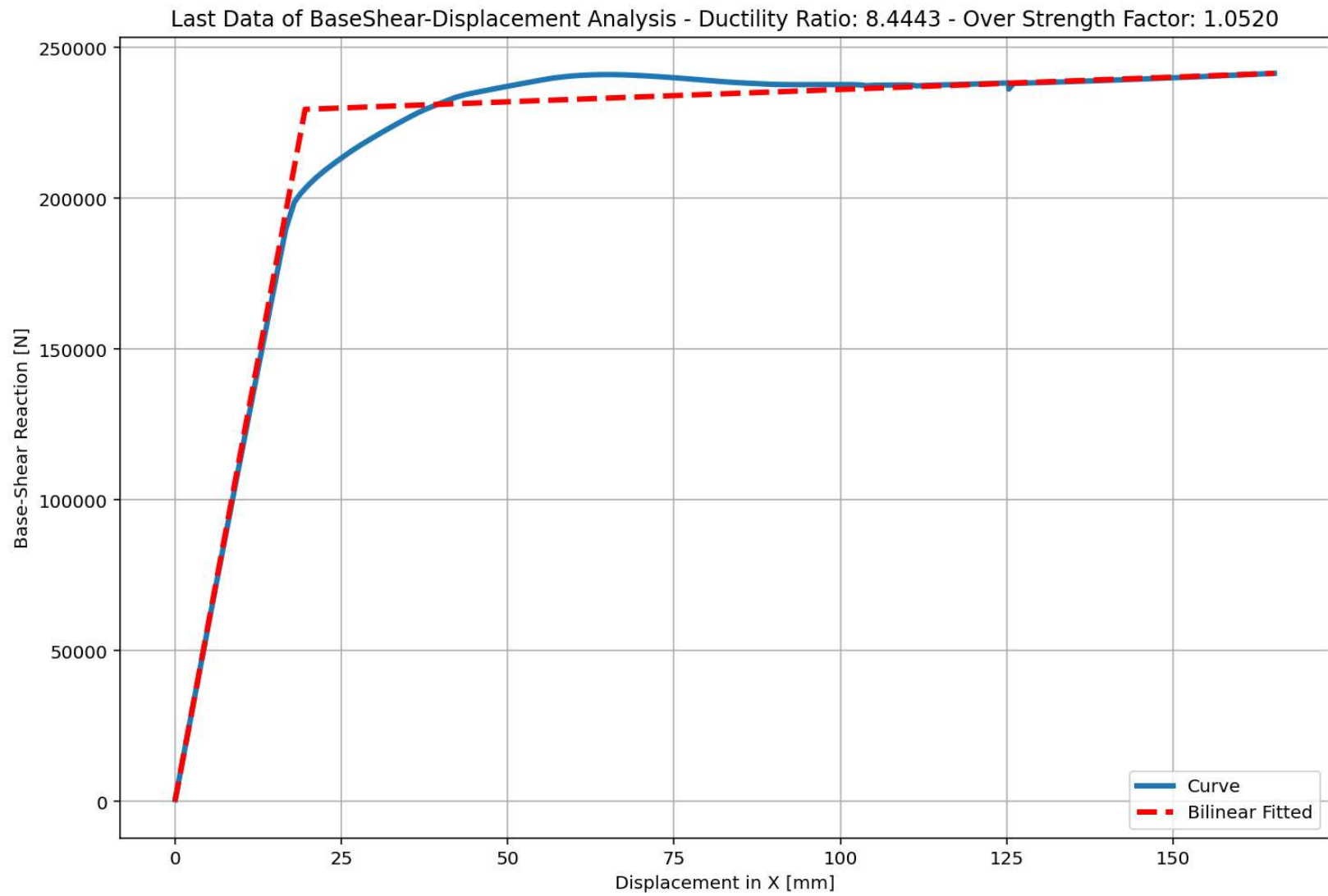


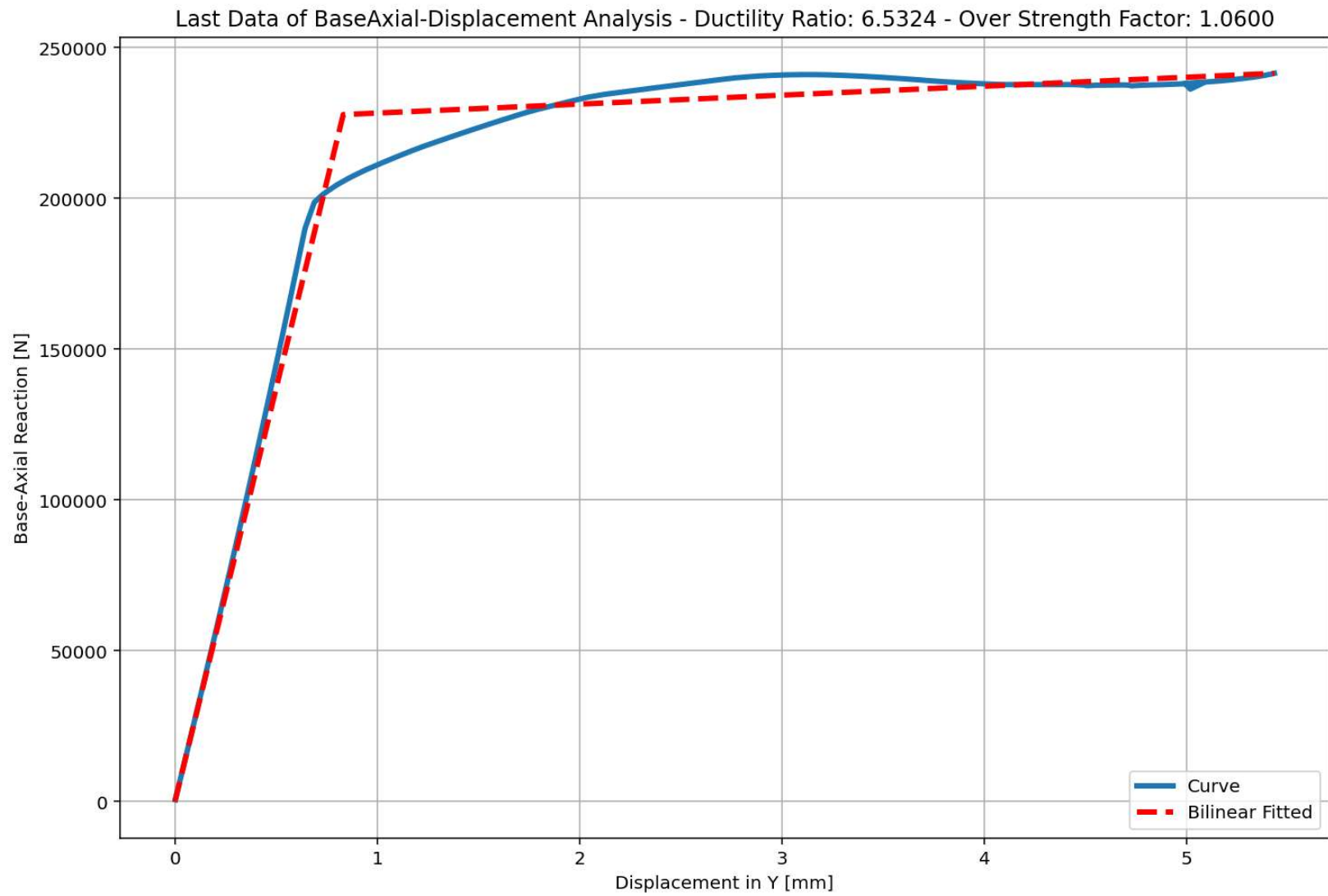
ROTATIONAL STIFFNESS-LATERAL STIFFNESS DIAGRAM

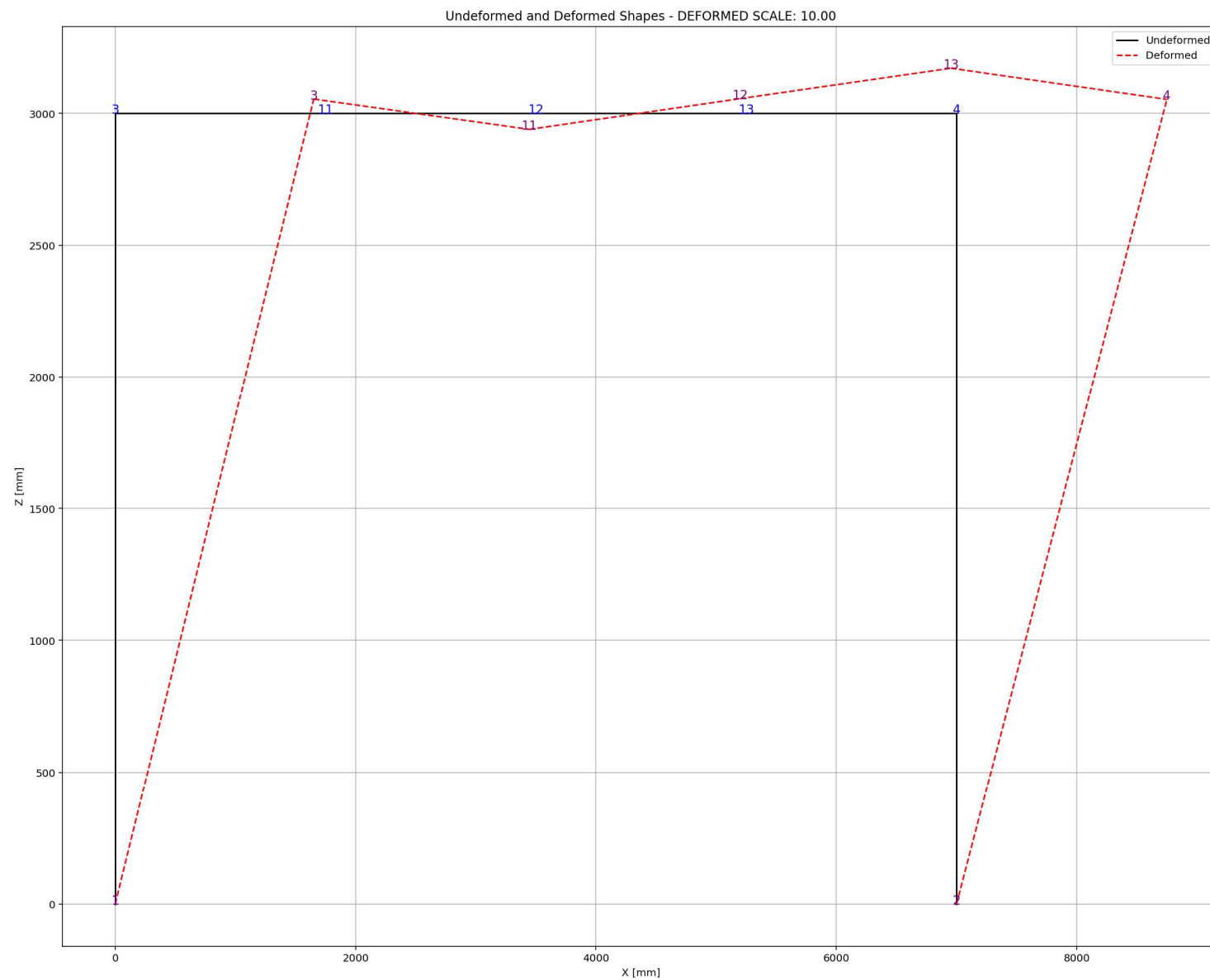


ROTATIONAL STIFFNESS-LATERAL STIFFNESS DIAGRAM









Start time (HH:MM:SS): 15:06:41

SUPPLY: 214817.69064

NormDispIncr KrylovNewton 0

Nonlinear Static Analysis Done.

SUPPLY: 214811.76988

18827.638671151362

IT: 4 - RESIDUAL: 2.669230e-09 - COLUMN SECTION REBAR DIAMETER 2.267750e+01

Optimum Section Rebar Diameter: 22.6775

Iteration Counts: 4

Convergence Residual: 2.6692301703e-09

Finish time (HH:MM:SS): 15:08:44

**OPTIMIZATION ANALYSIS DURATION IS 2 MINUTES WITH  
4 ITERATIONS**