

# DOME REPORT

## Rectangular bar with a transverse hole in bending

Made by

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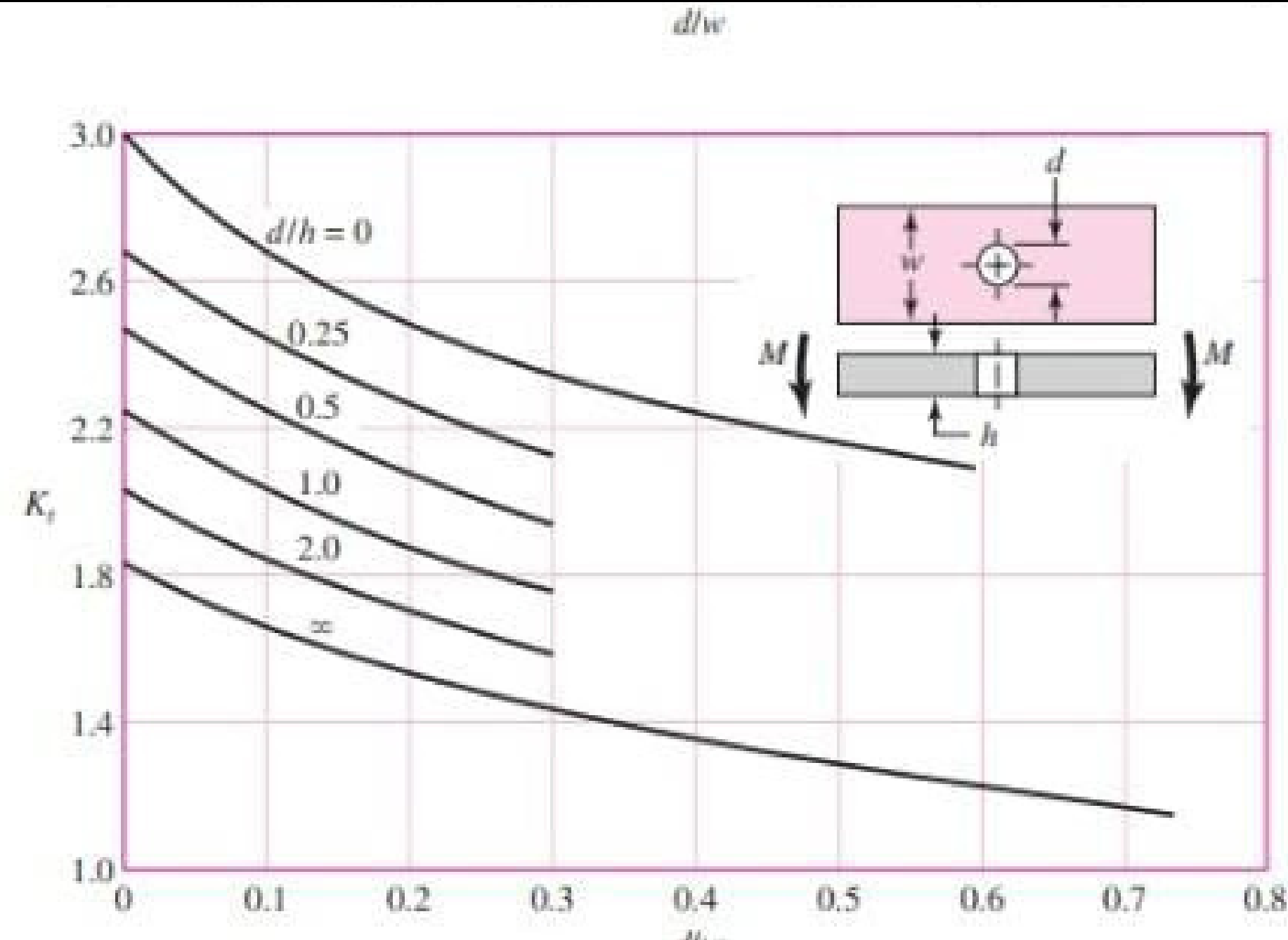
Shristi agrawal

# Model and dimensions

Thickness-3.07 mm  
Length-30mm  
Width-20mm  
Moment-40Nm

**Figure A-15-2**

Rectangular bar with a transverse hole in bending.  
 $\sigma_0 = Mc/I$ , where  
 $I = (w - d)h^3/12$ .



# Ansys model

**A: Static Structural**

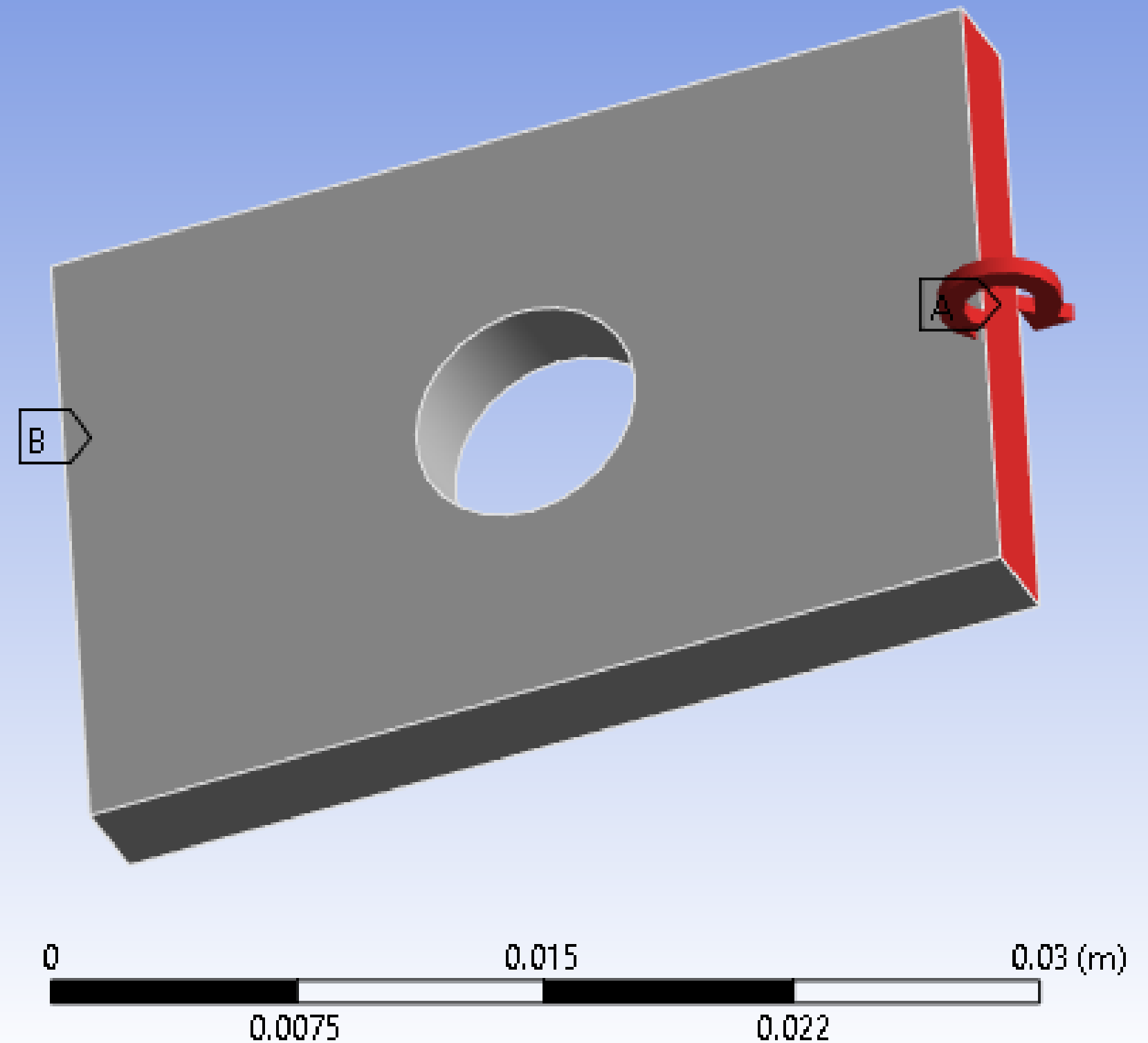
Fixed Support

Time: 1. s

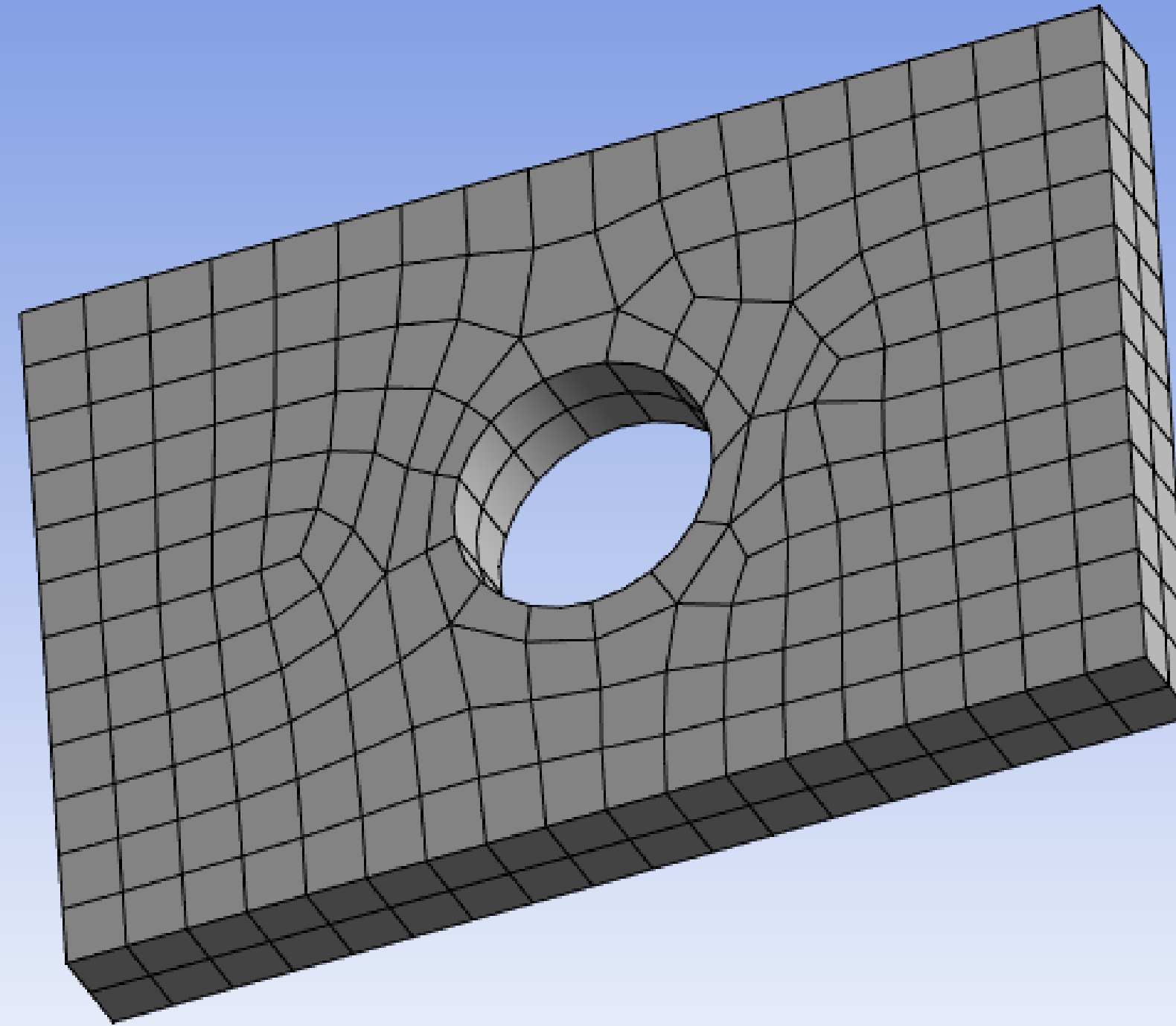
07-11-2022 18:12

**A** Moment: 40. N·m

**B** Fixed Support



# Ansys model with mesh



0 0.01 0.02 (m)



A horizontal scale bar with alternating black and white segments, used to indicate the physical dimensions of the model in meters.



# Stress distribution

A: Static Structural

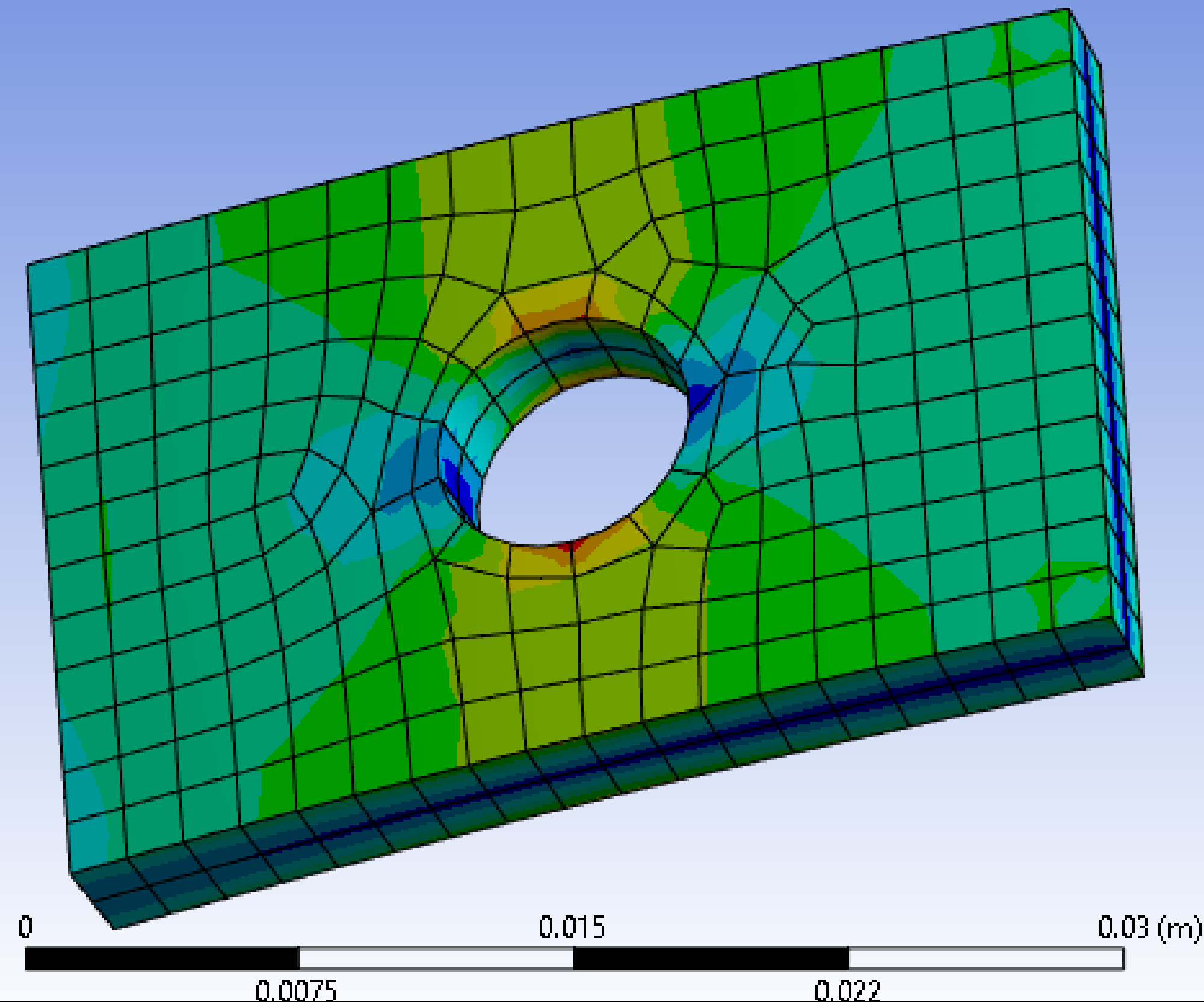
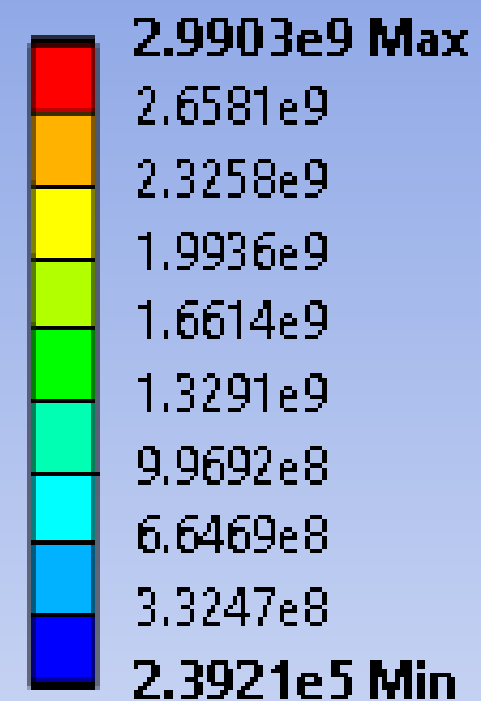
Equivalent Stress

Type: Equivalent (von-Mises) Stress

Unit: Pa

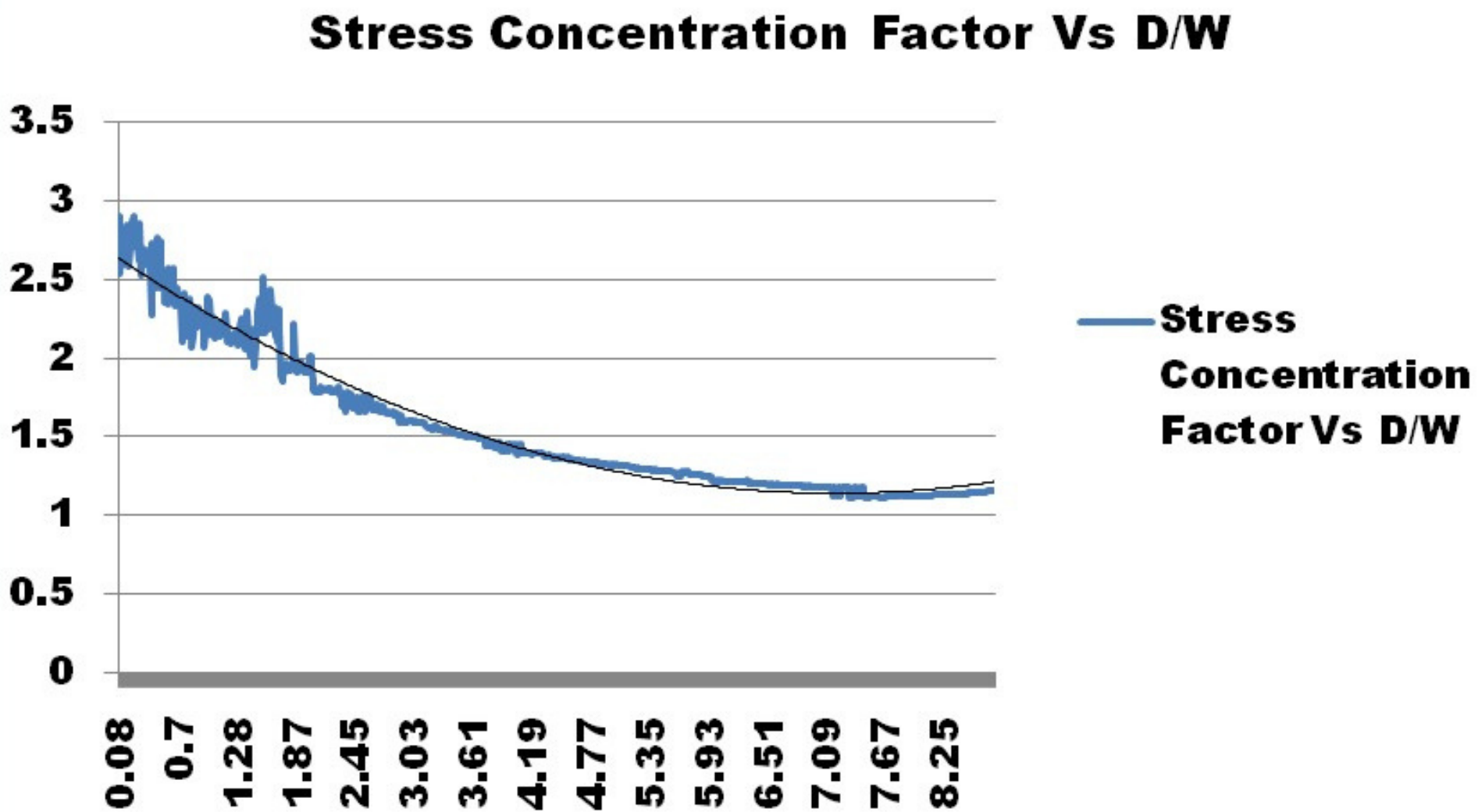
Time: 1 s

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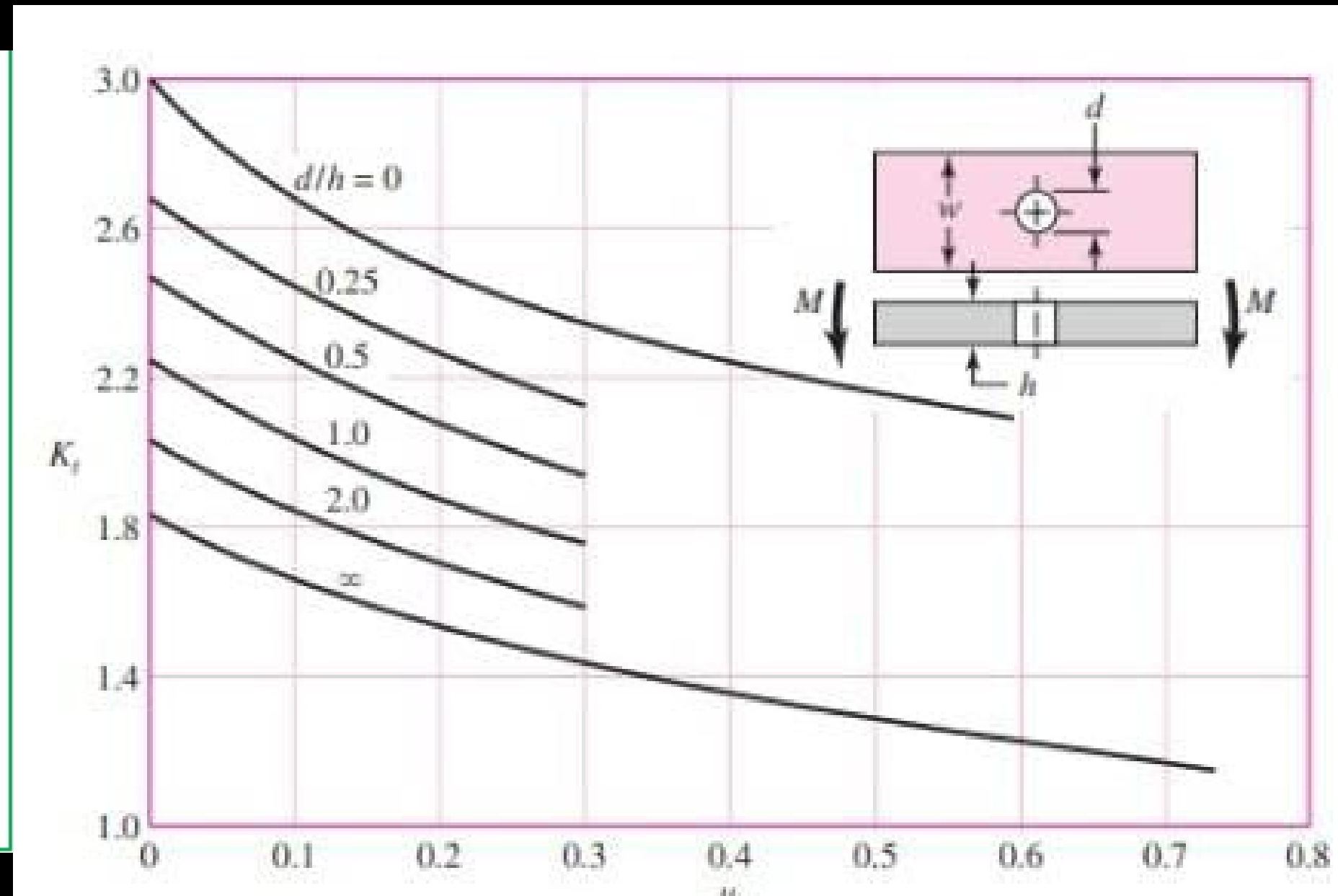


# Results

## Anslys model results



## Theoretical results



# Implementing the code

- Linear regression of order 2 using the sklearn python library
- Trained model using 900 simulation results
- Used pandas library to read the simulation data
- Achieved **97.24%** accuracy ✓

```
from sklearn.preprocessing import PolynomialFeatures
poly=PolynomialFeatures(degree=2, include_bias=False)
x_train_poly=poly.fit_transform(x_train_scaled)
x_test_poly=poly.transform(x_test_scaled)
model=LinearRegression()
model.fit(x_train_poly,y_train)
```

# Outcome of the model

Training data

Mean Absolute Error: 0.056394100951824885

Mean Squared Error: 0.005596098289003984

Root Mean Squared Error: 0.07480707378987621

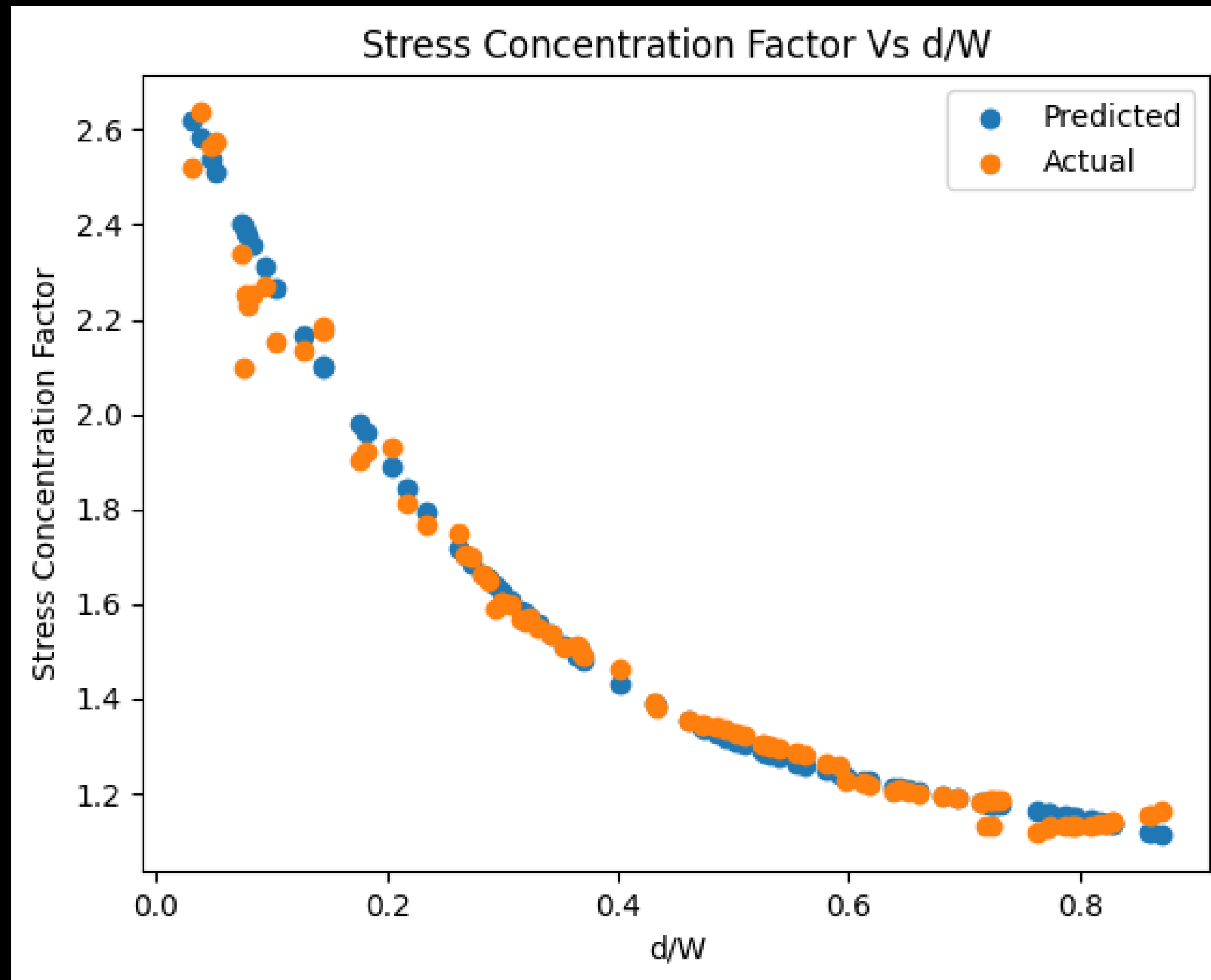
R2 Score: 0.9724630711159834

ACCURACY OF MODEL IS: 97.24630711159834

d/W	Kt by ansys	Kt by python model
0.4	1.432668	1.448028
0.401	1.435425	1.446134
0.402	1.461936	1.44424619
0.403	1.459901	1.44236402
0.404	1.396059	1.44048783



# Best fit line curve



# Problems faced

- Tried using ansys script but during which we faced a lot of difficulty.
- Errors faced during creating python model



# Thank You