

Determination of Fragility Curves

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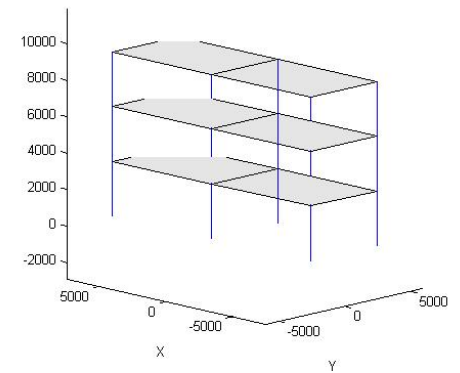
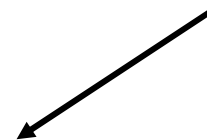
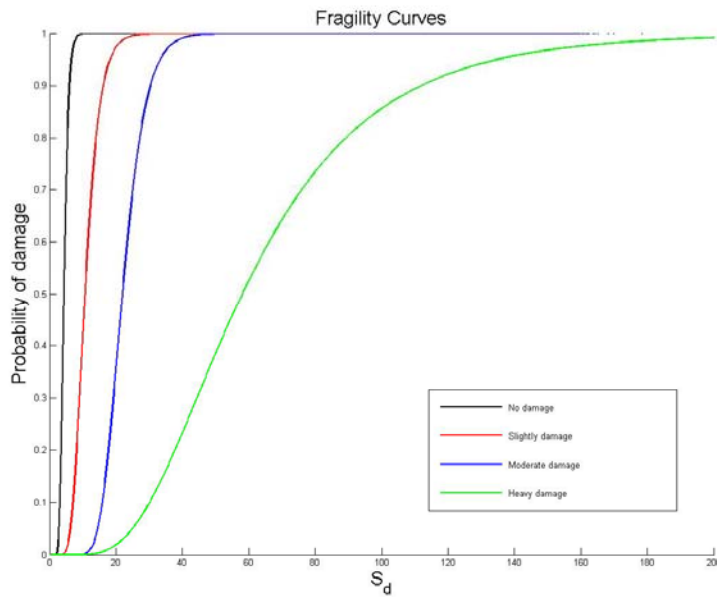
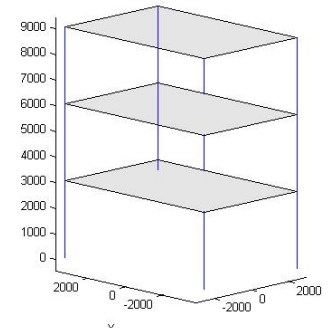
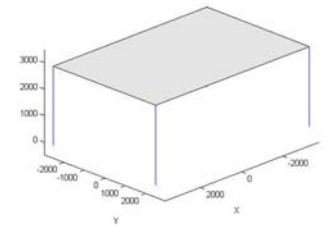
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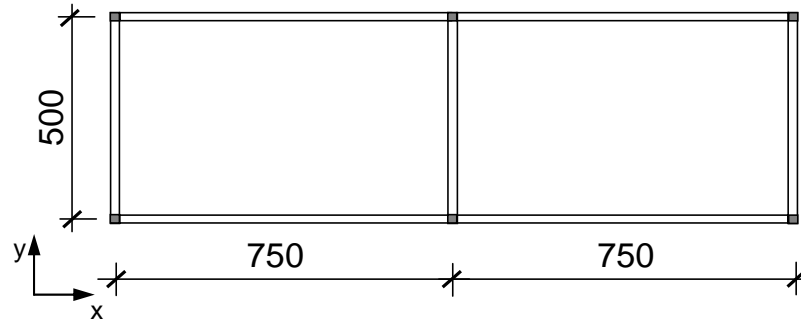
As a natural hazard occurs thousands of structures can be affected.

To simplify the problem they can be classified into groups by using indicators (materials, number of stories, etc).

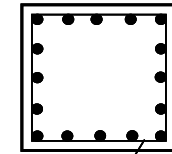
The problem is then to determine the vulnerability of these classes of structures.





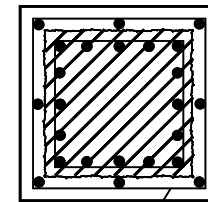


Columns
30x30 16 ϕ 16

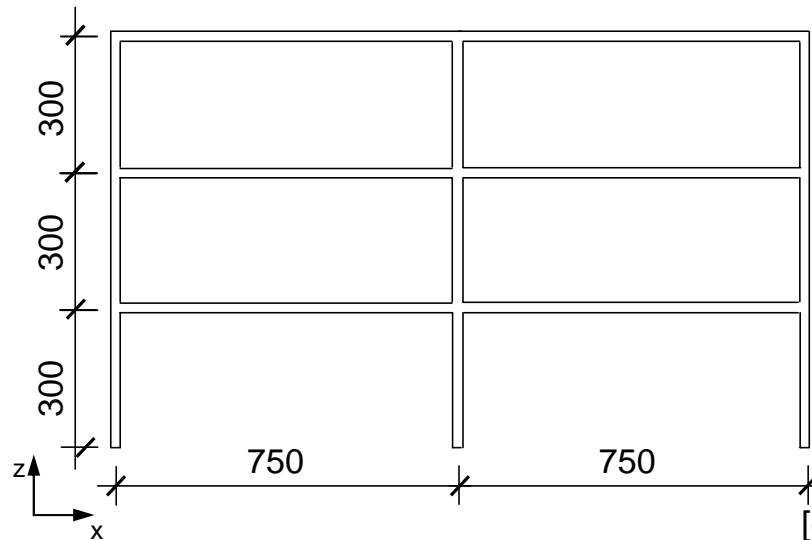


stirrups ϕ 8@18

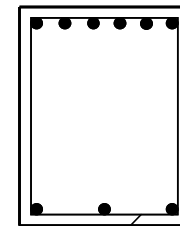
Columns retrofitted
50x50 24 ϕ 16



stirrups ϕ 8@18

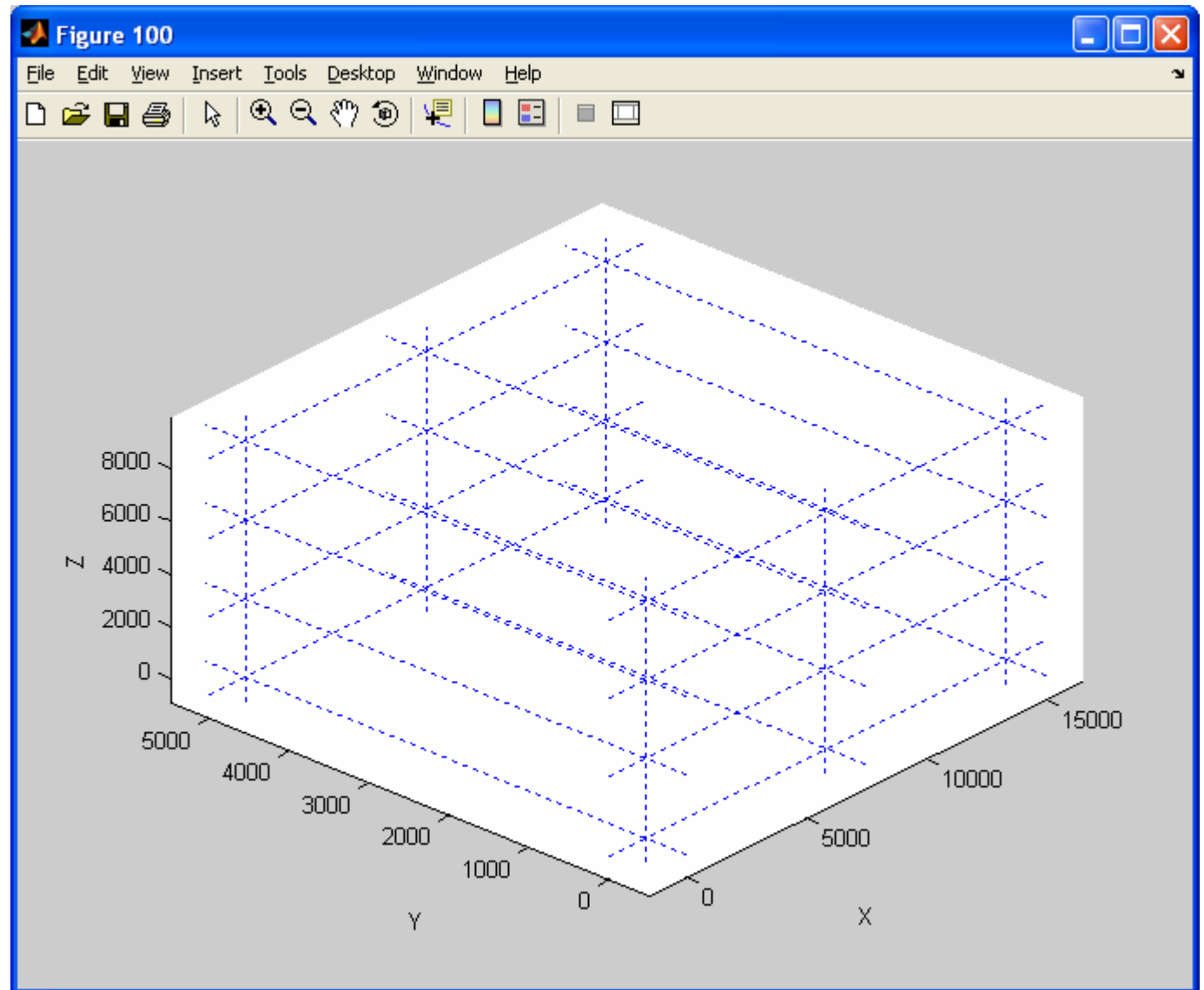


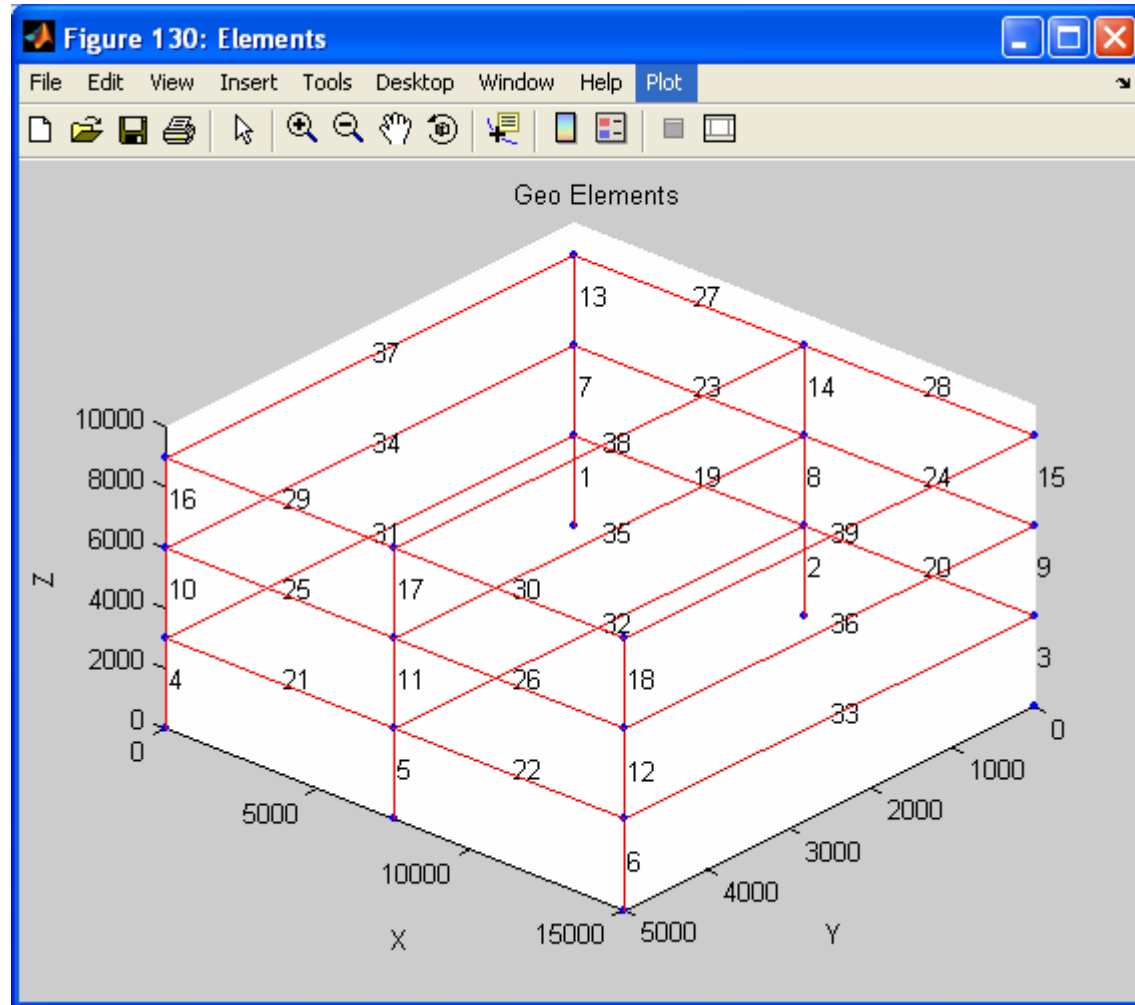
Beams
30x40 9 ϕ 16



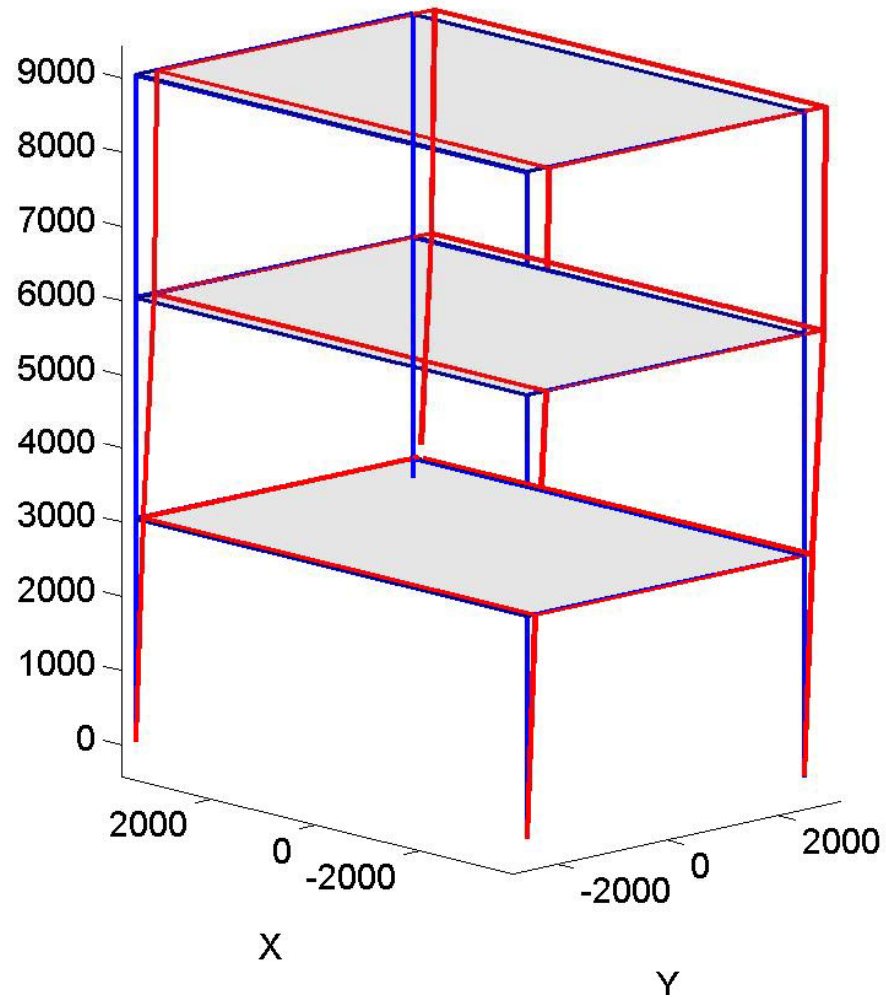
stirrups ϕ 8@18

[cm]

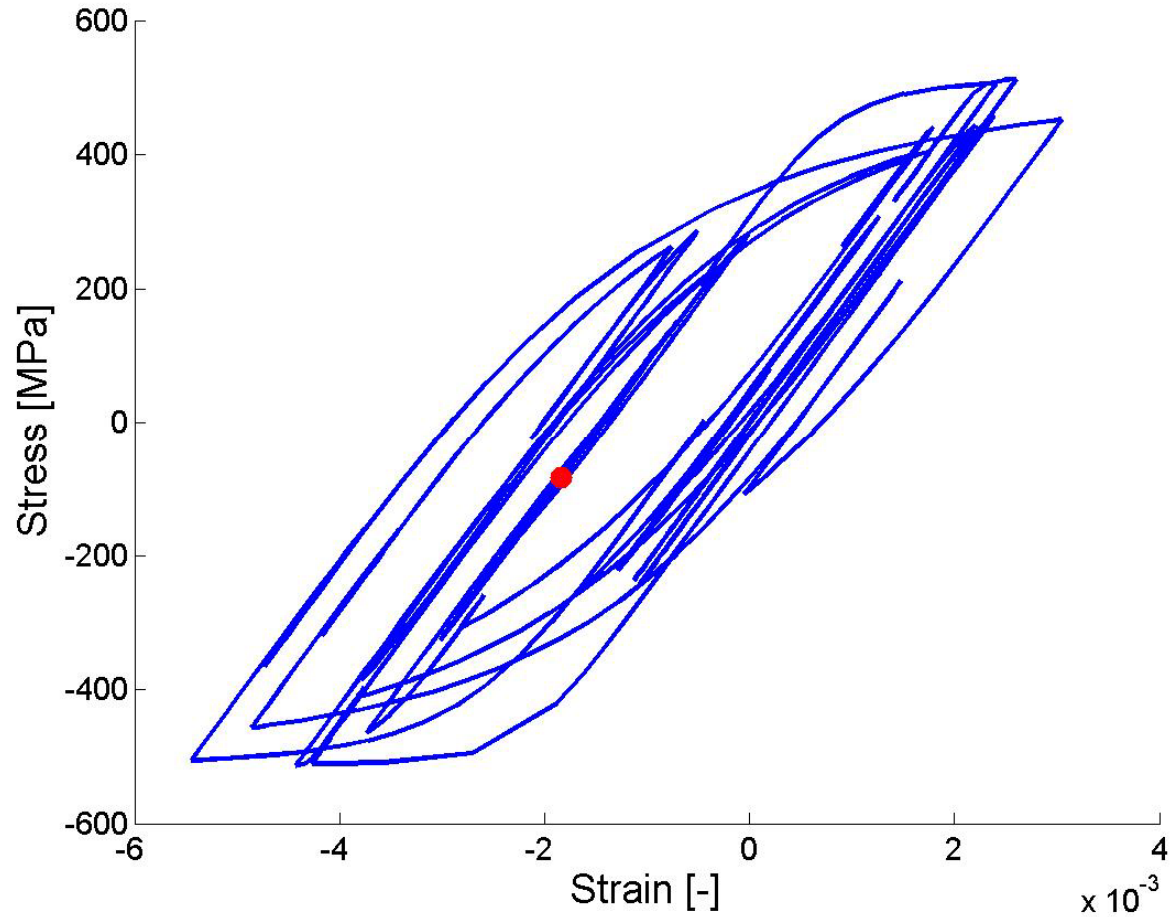




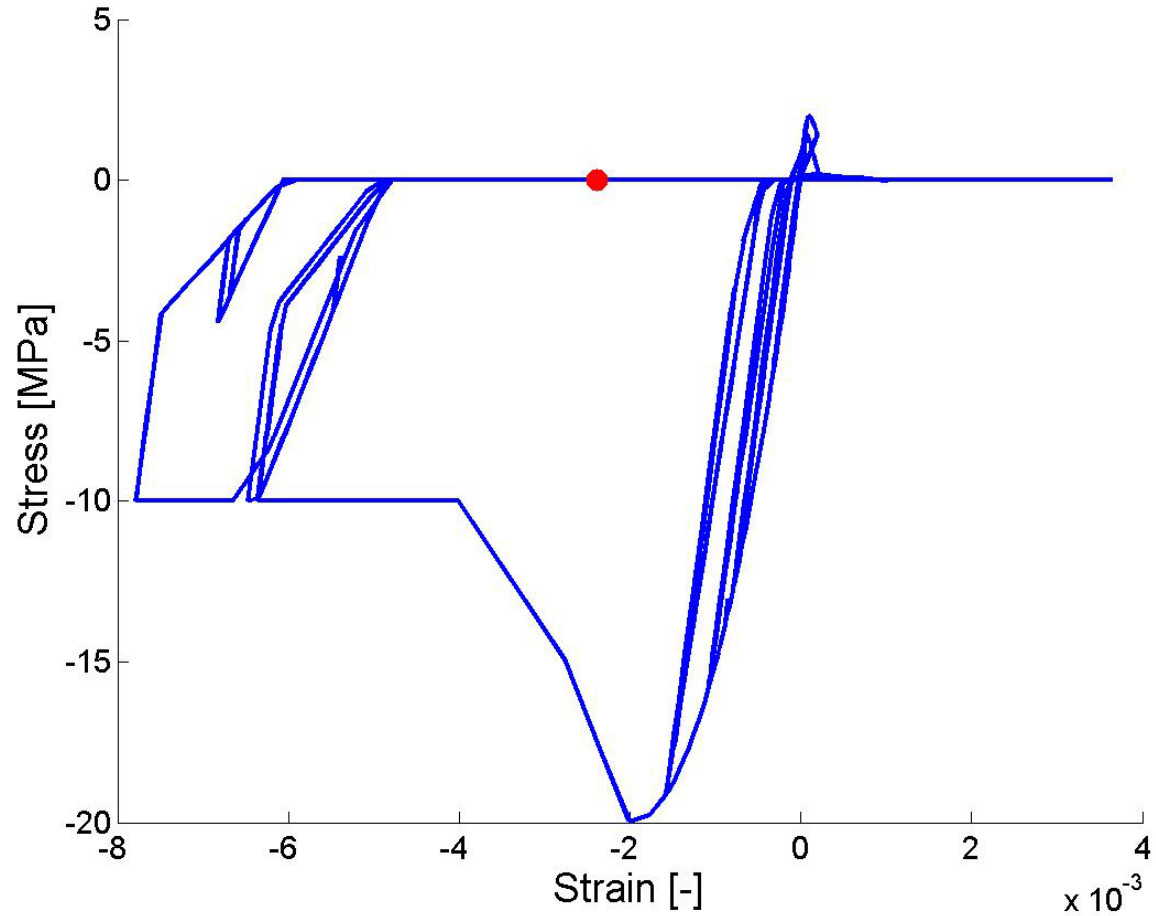
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OutputDataFil...	'C:\PreOpenSeesPost\Matlab\MyModels\T5\T5.dat'
Title	<1x5 struct>
NDimension	3
NDOF	6
BayX	7500
BayY	5000
DeltaZ	3000
ColumnX	[0 7500 15000]
ColumnY	[0 5000]
ColumnZ	[0 3000 6000 9000]
NodeDelta	[1 3 6 9]
Floor1	2
PlotOffset	150
ColumnNo	<3x2x4 double>
BeamX	<2x2x4 double>
BeamY	<3x1x4 double>
RigidDiaphragm	<1x6 struct>
DampingRatio	0.03
TEigen	0.78882
AlphaM	0.24226
BetaK	0.0037143
BetaKComm	0
BetaKInit	0
GeomTransf	<1x3 struct>
Node	<1x30 struct>
NodeNoToInd...	<1x30 double>
CrossSection	<1x12 struct>
Element	<1x39 struct>
Mat	<1x12 struct>
LoadStatic	<1x3 struct>
LoadSeismic	<1x1 struct>
Damping	<1x1 struct>
Scenario	<1x1 struct>

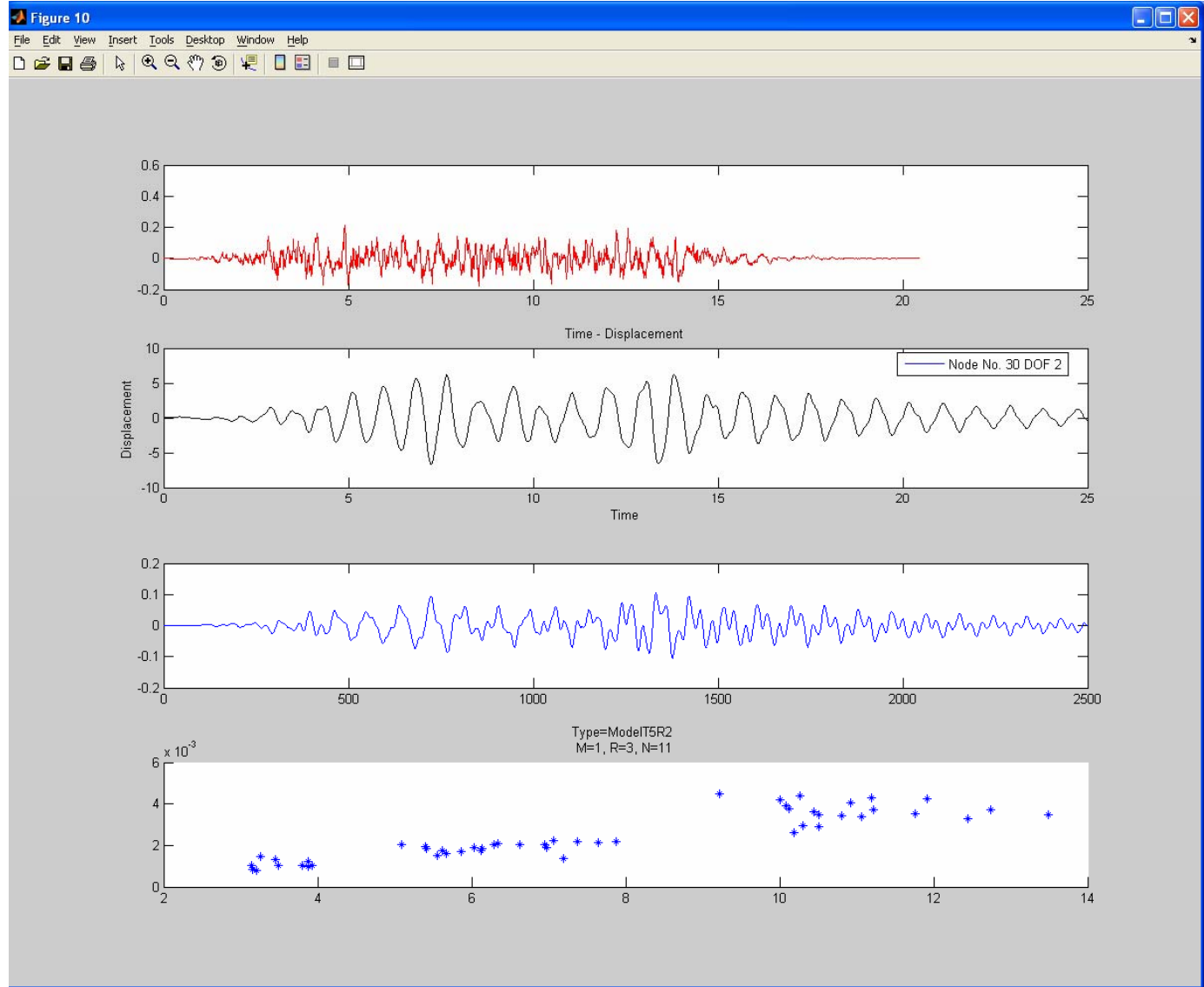


Stres - Strain Relation for Steel

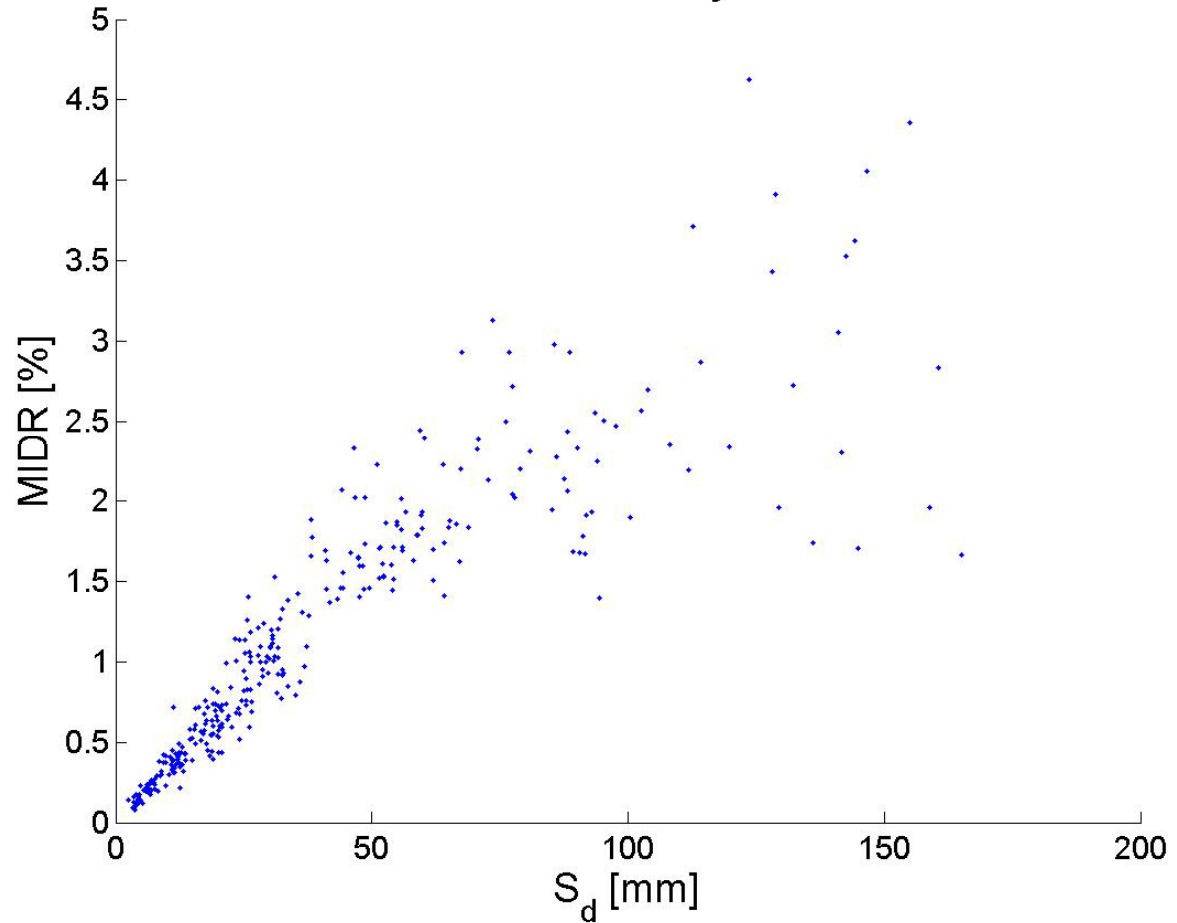


Stres - Strain Relation for Concrete

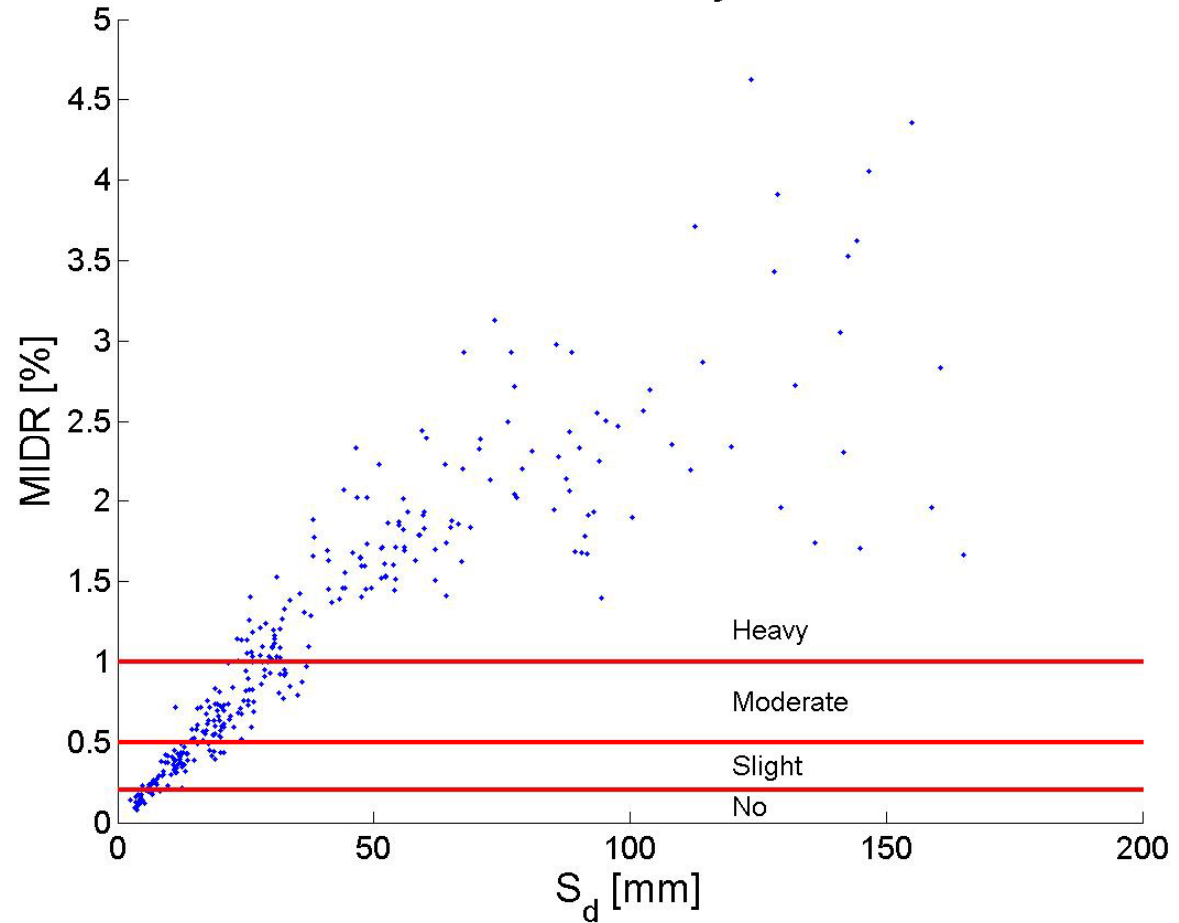




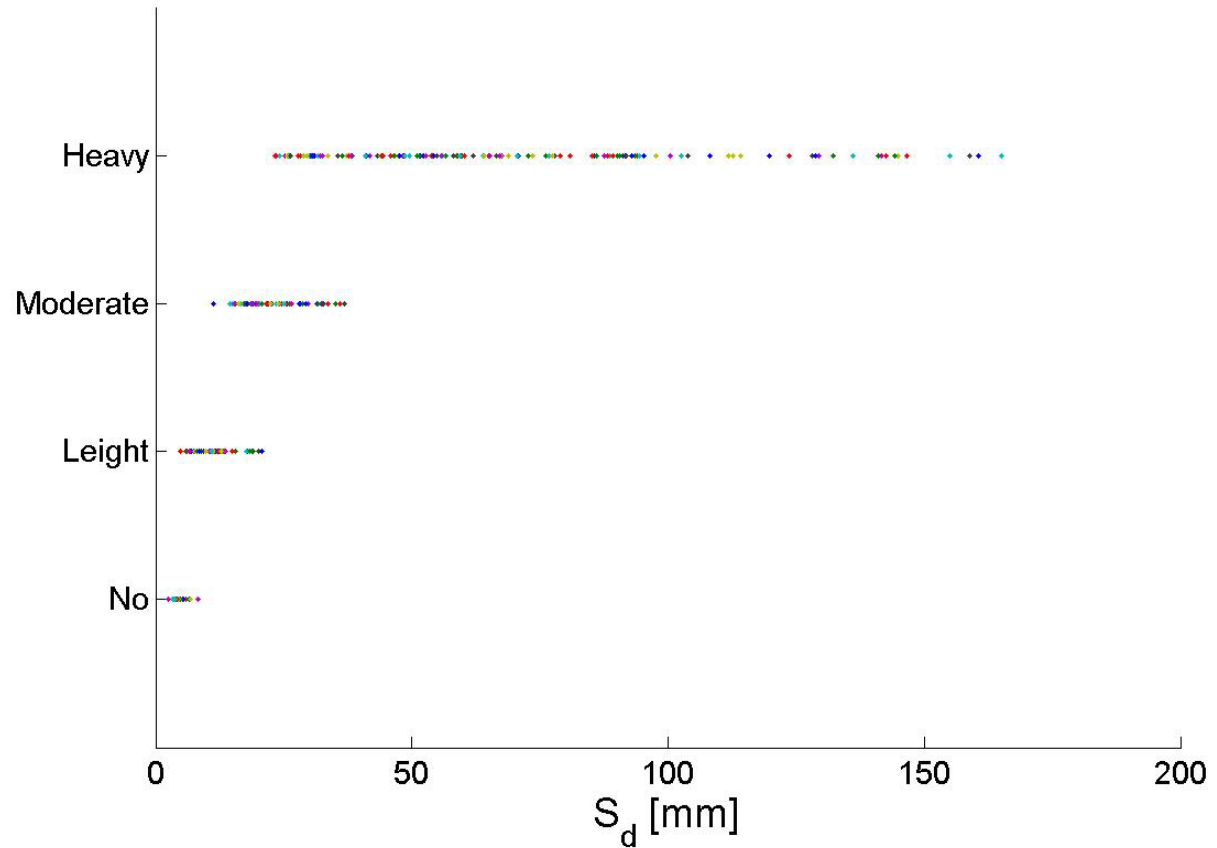
Maximum Interstory Drift Ratio



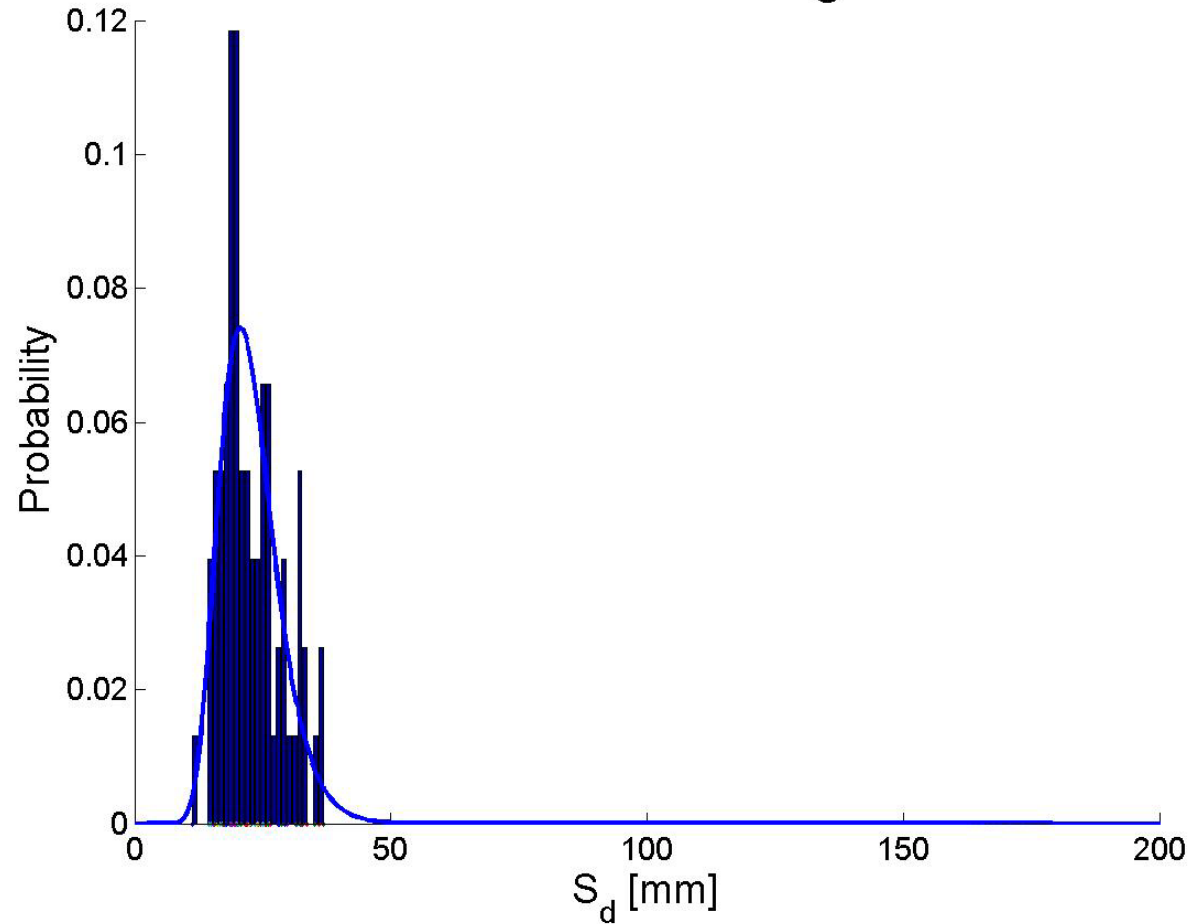
Maximum Interstory Drift Ratio



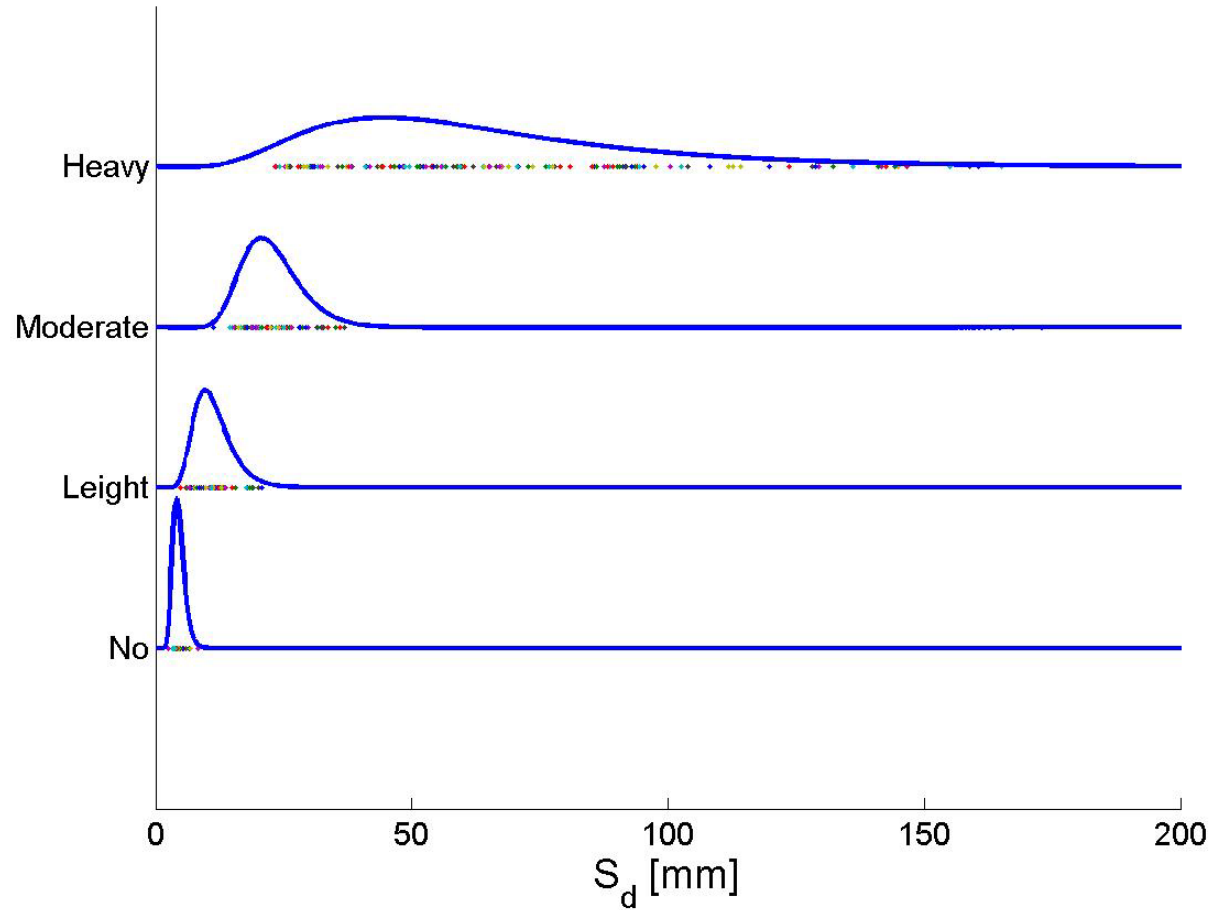
Maximum Interstory Drift Ratio in Damage Classes

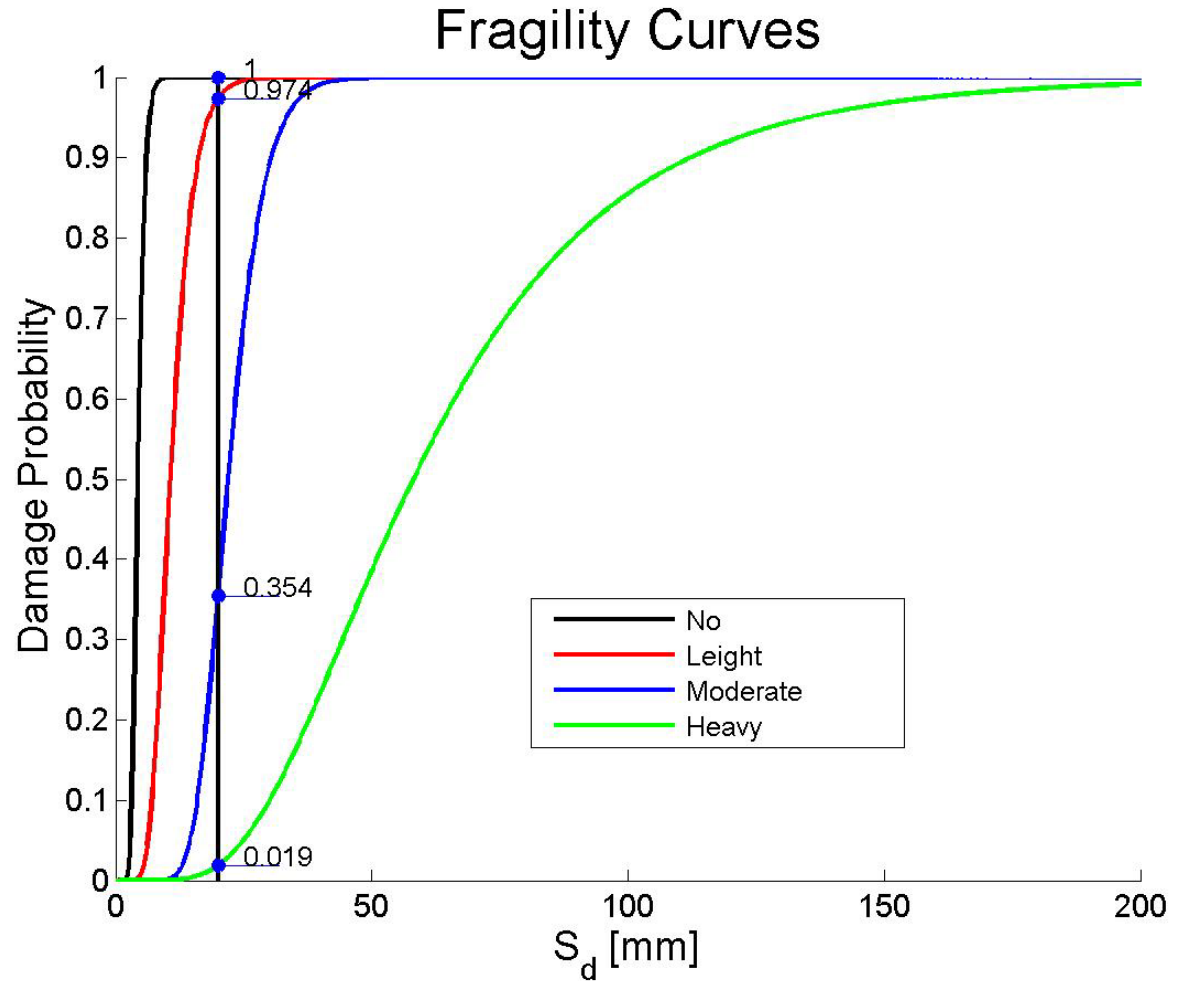


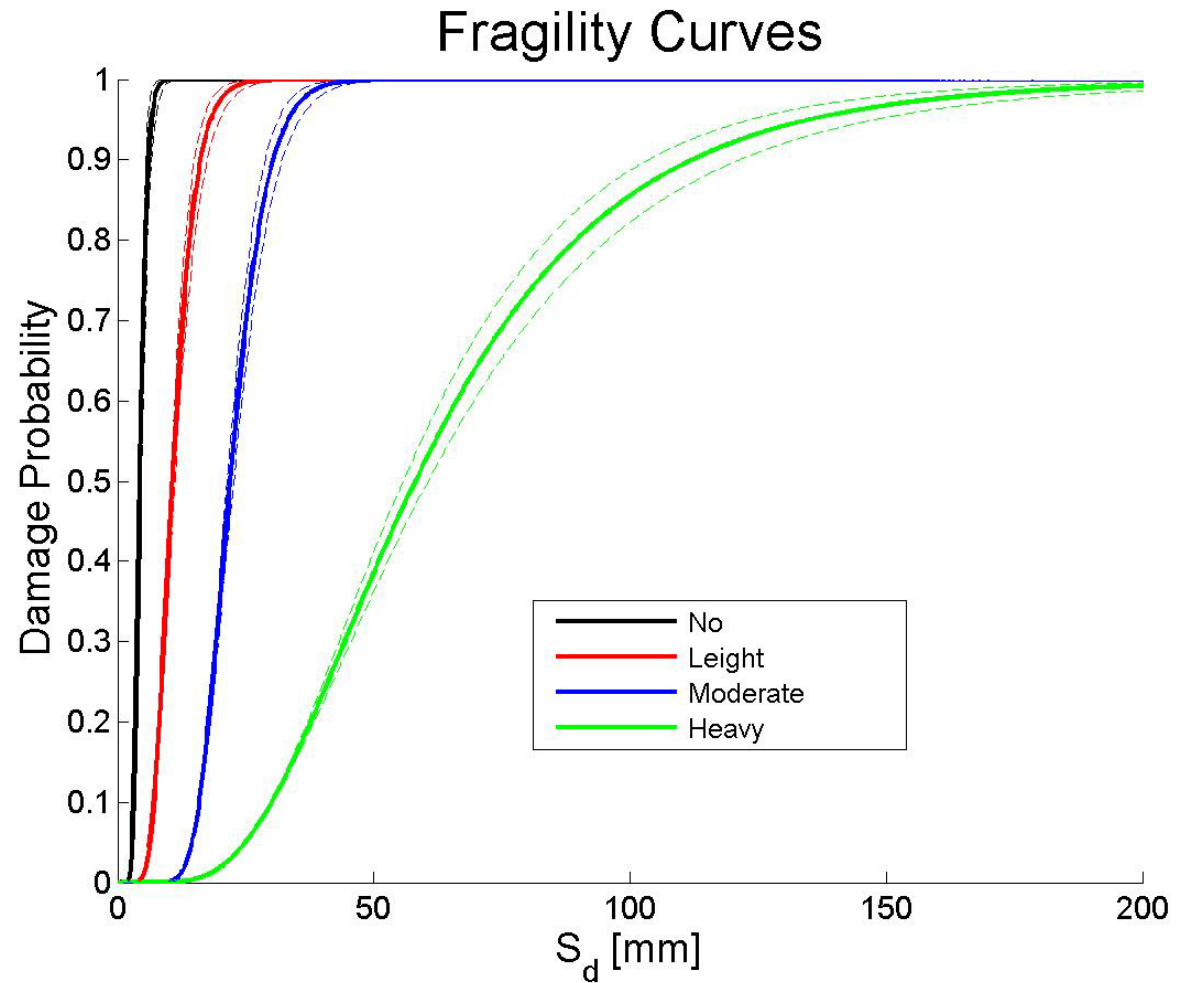
Moderate Damage

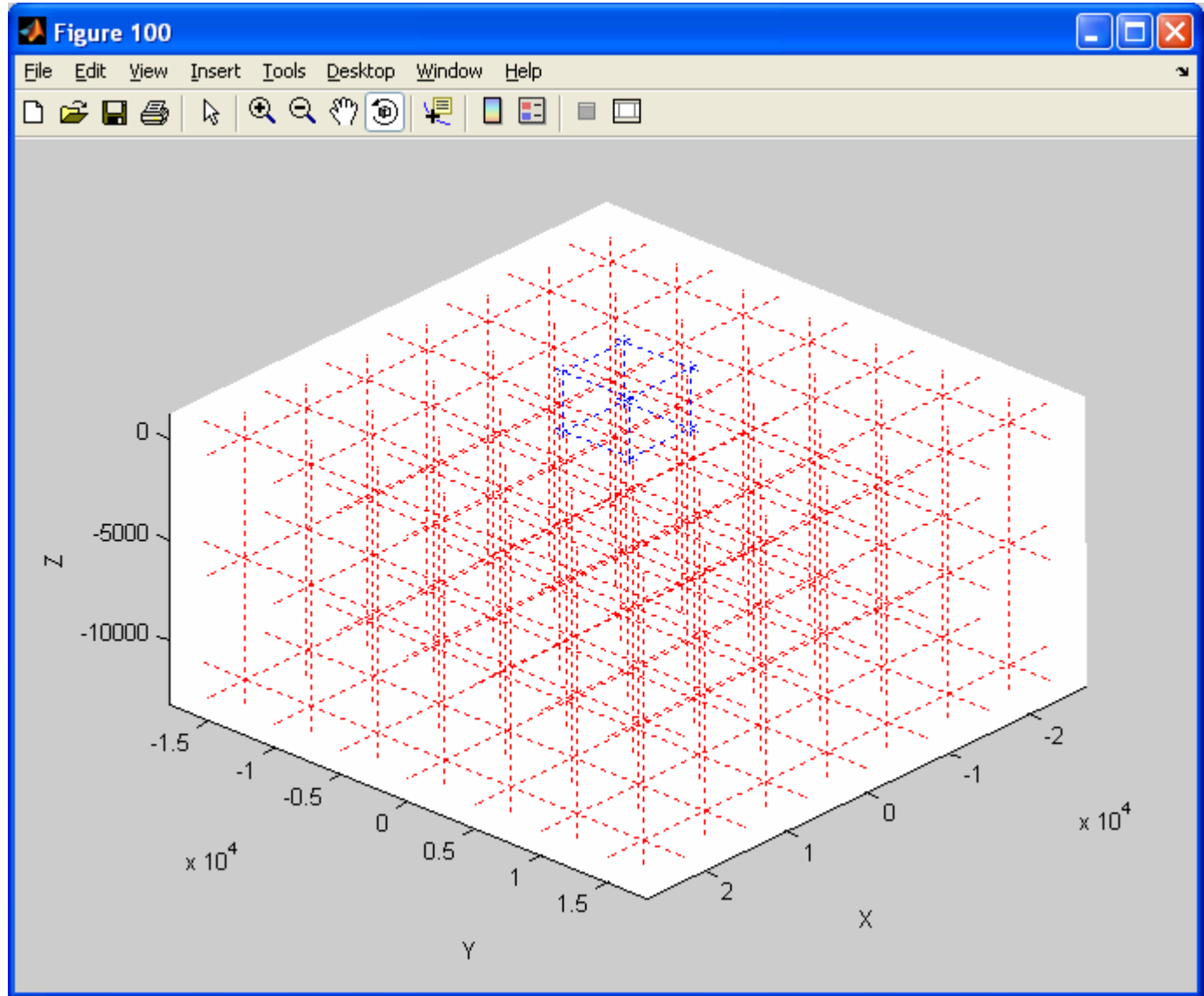


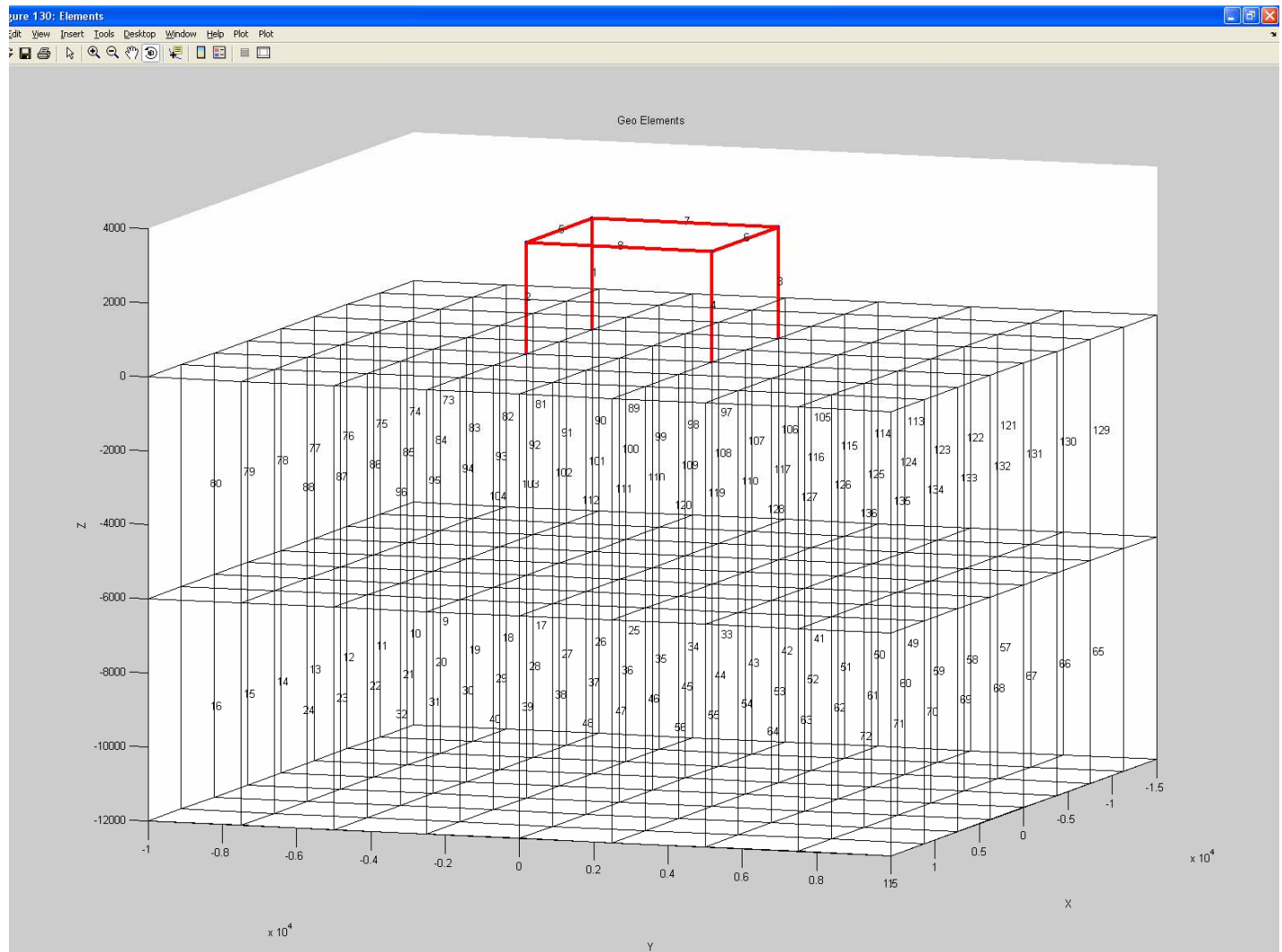
MIDR: Log Normal











- A consistent and generic program environment has been developed.
- Method is based on a grid and by using data structures in Matlab.
- The core calculations are performed using OpenSees
- Verifications of the structural calculations are needed.
- After verifications several simulations including variations of materials parameters will be performed
- The modeling of the soil is ongoing and will consist of application of SHAKE and of 3D modeling in OpenSees