NEPAL EARTHQUAKE DATA ANALYSIS

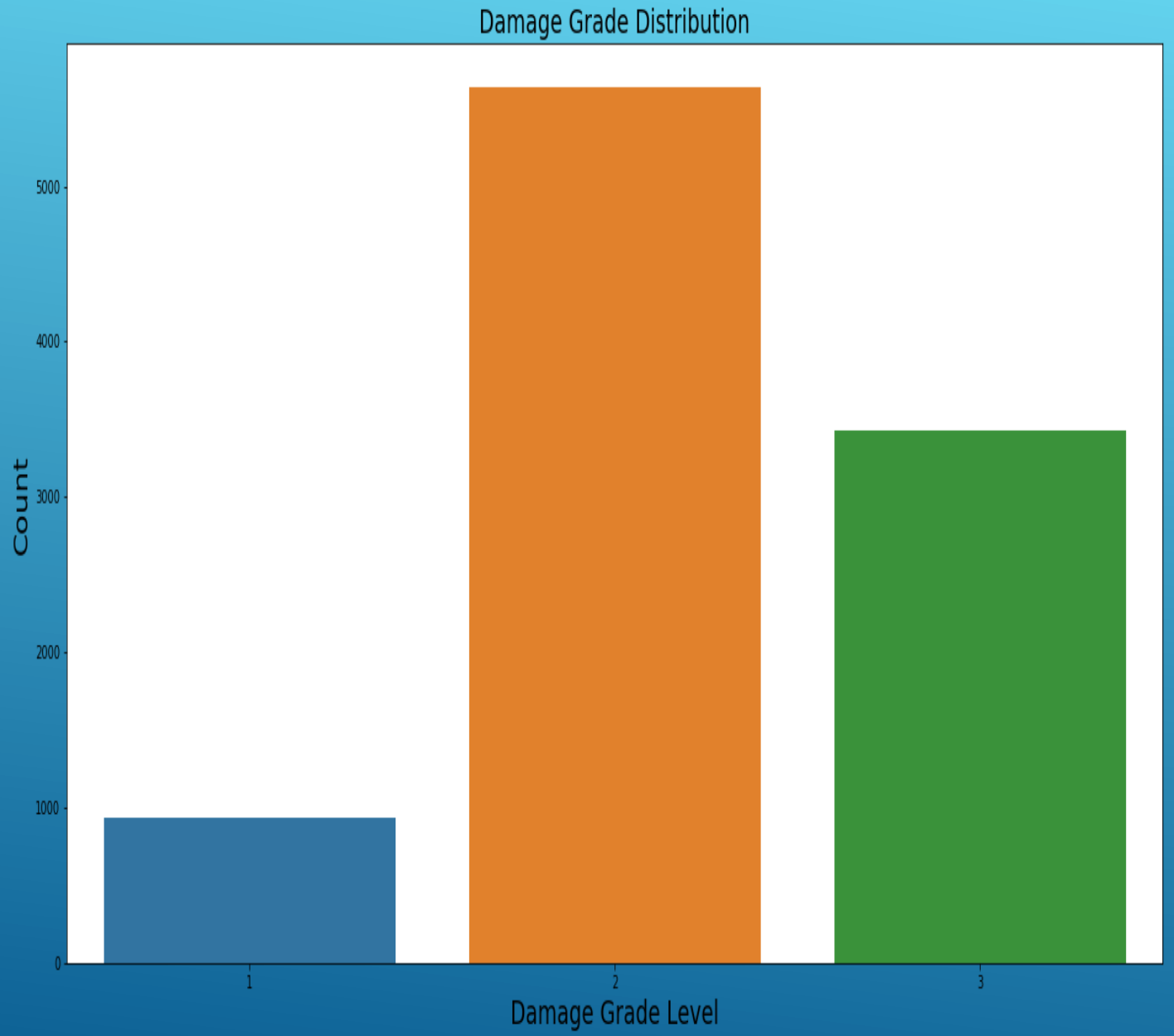
GENERAL DATA INFORMATION

- **Data taken from Central Bureau of Statistics, Nepal**
- **Time period is April 2015**
- **Area analysed is Gorkha District of Nepal**

PRESENTATION OBJECTIVE

- **How much damage did the earthquake cause?**
- **How did different building materials and combinations survive the earthquake?**
- **How does building age relate to damage caused?**

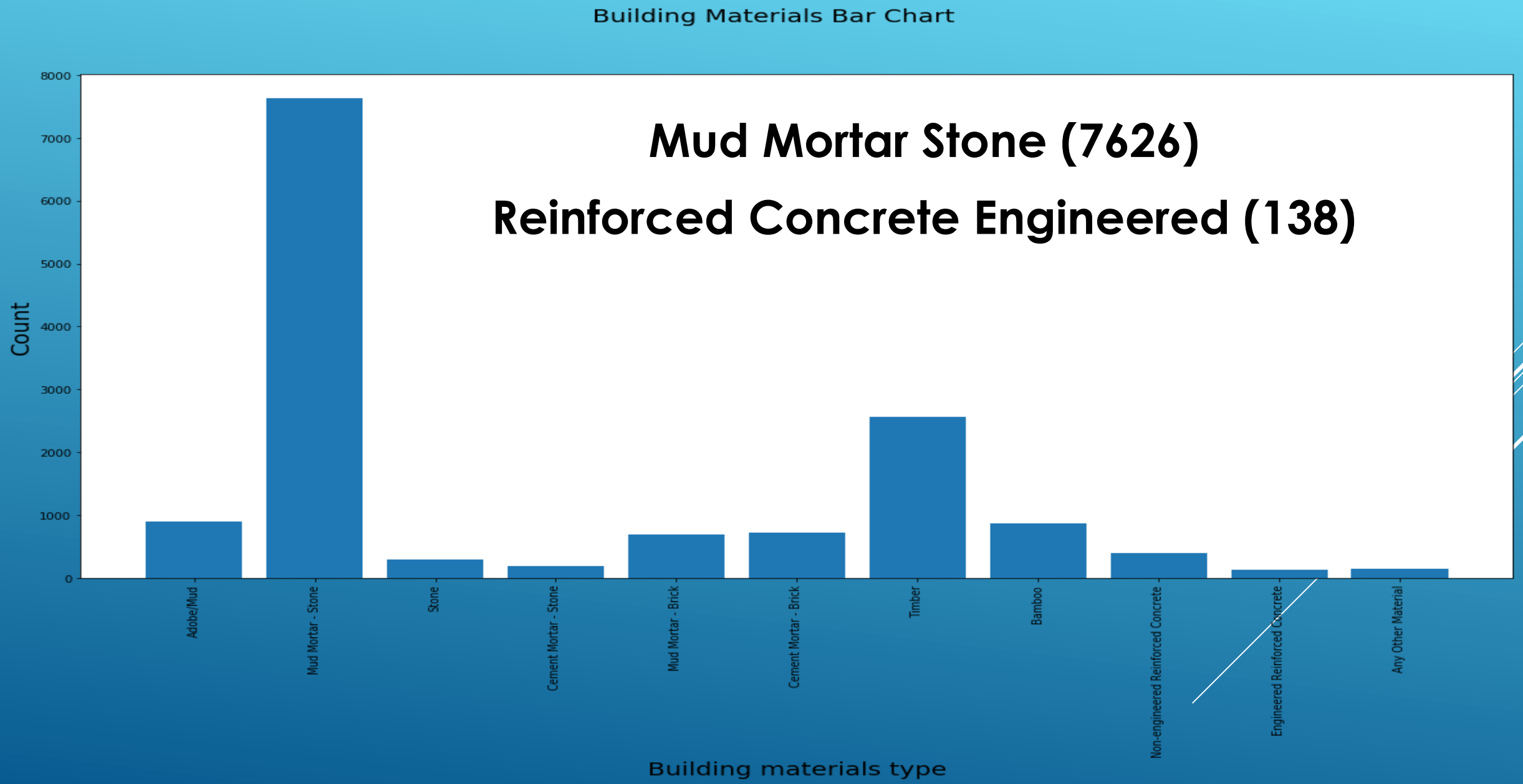
HOW MUCH DAMAGE DID THE EARTHQUAKE CAUSE?



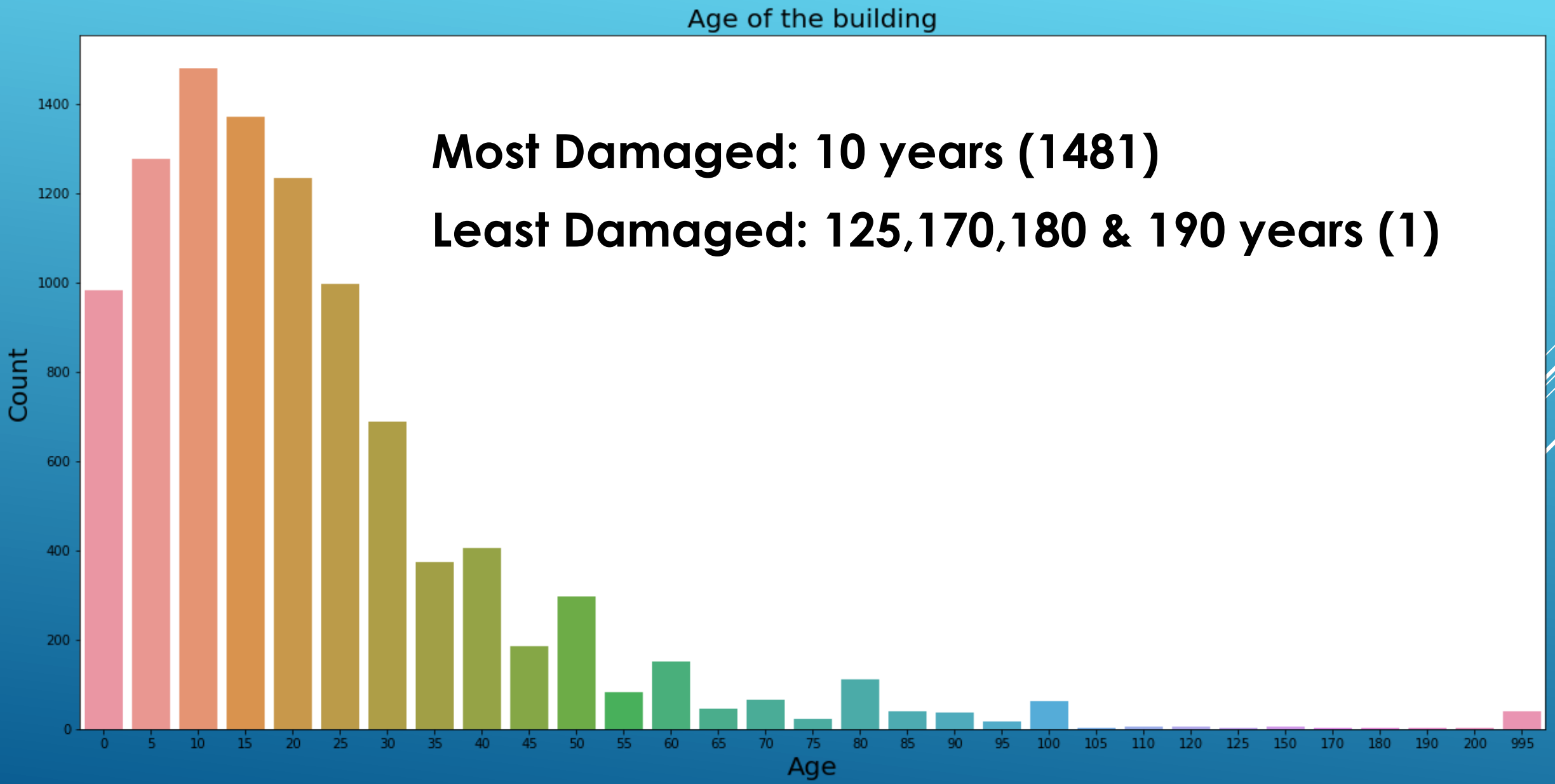
DAMAGE LEVELS

- **Highest grade is 2 (Medium) – 5636**
- **Lowest grade is 1 (Low) – 938**

BUILDING MATERIAL TYPES



BUILDING AGES OVERALL



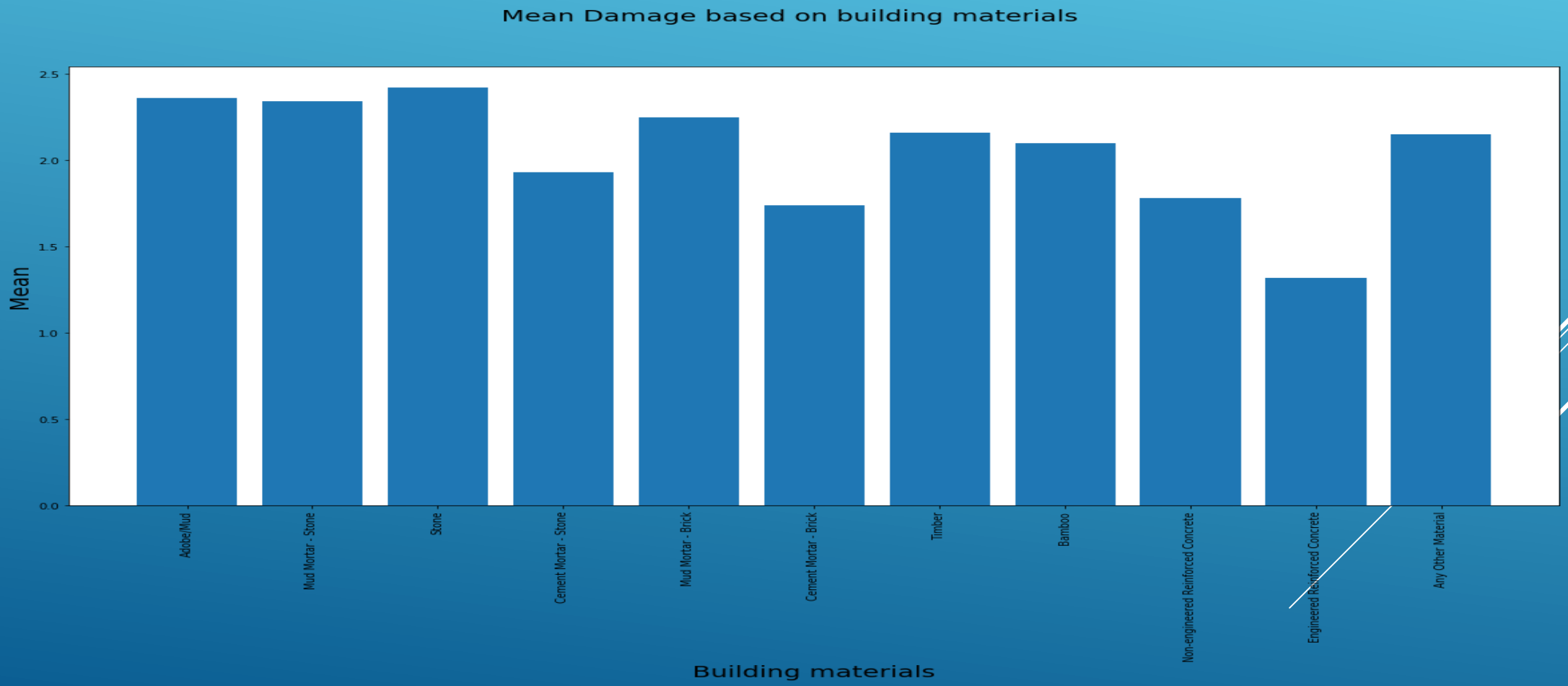
Most Damaged: 10 years (1481)

Least Damaged: 125,170,180 & 190 years (1)

HOW DID DIFFERENT BUILDING MATERIALS AND COMBINATIONS SURVIVE THE EARTHQUAKE?

AVERAGE DAMAGE CALCULATED FOR BUILDINGS THAT USE EACH MATERIAL TYPE

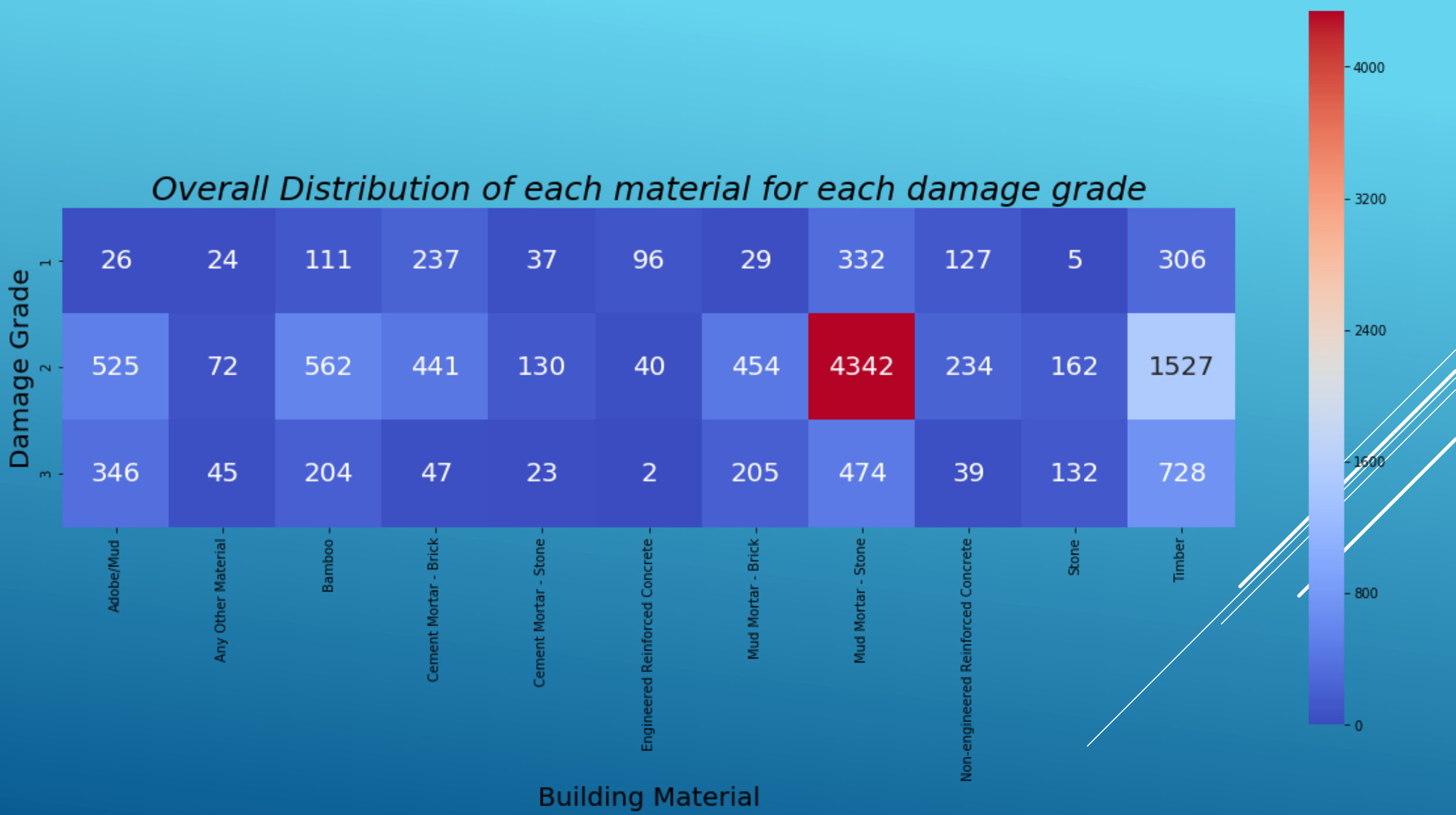
Highest: Stone (2.42); Lowest: Reinforced Concrete (1.32)

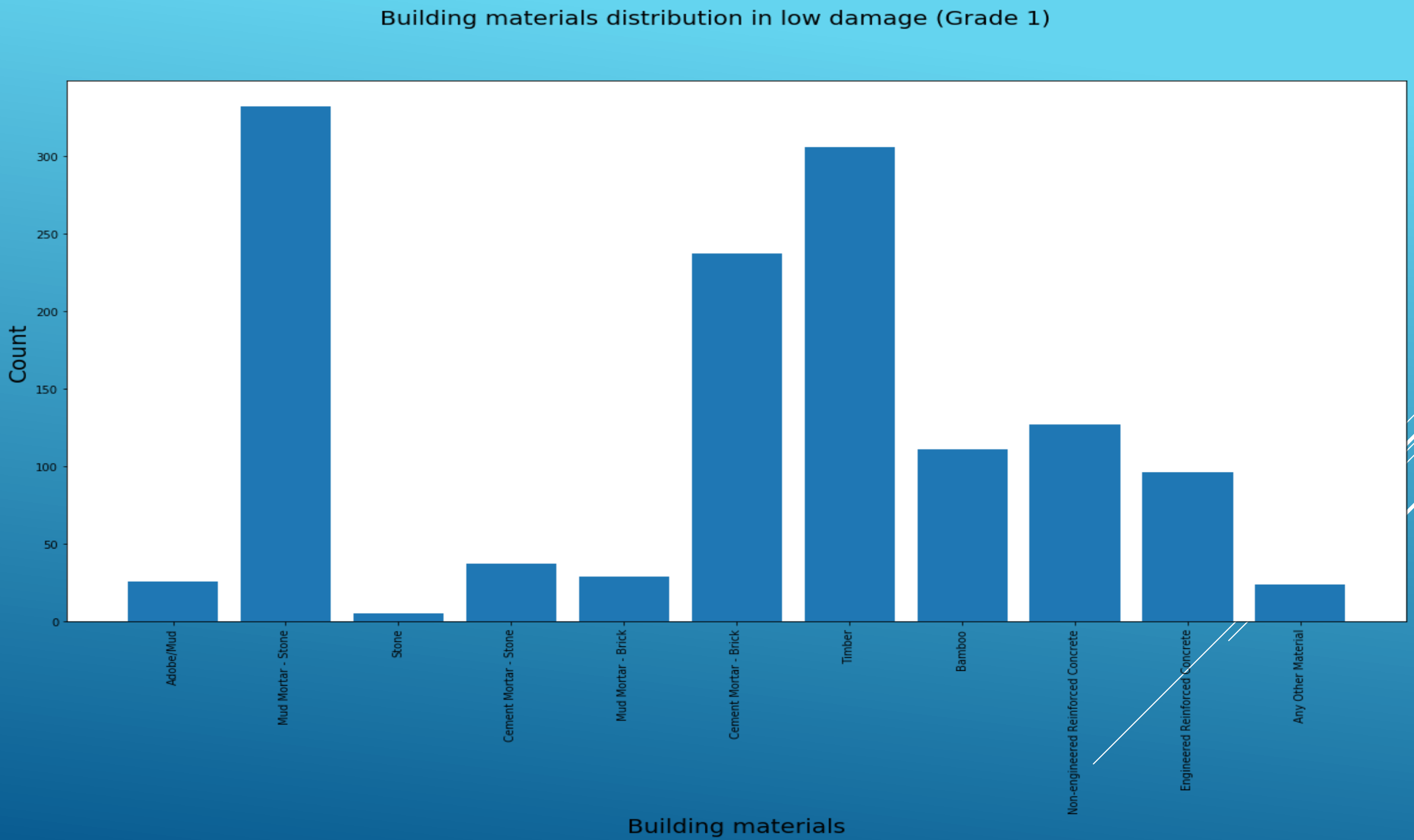


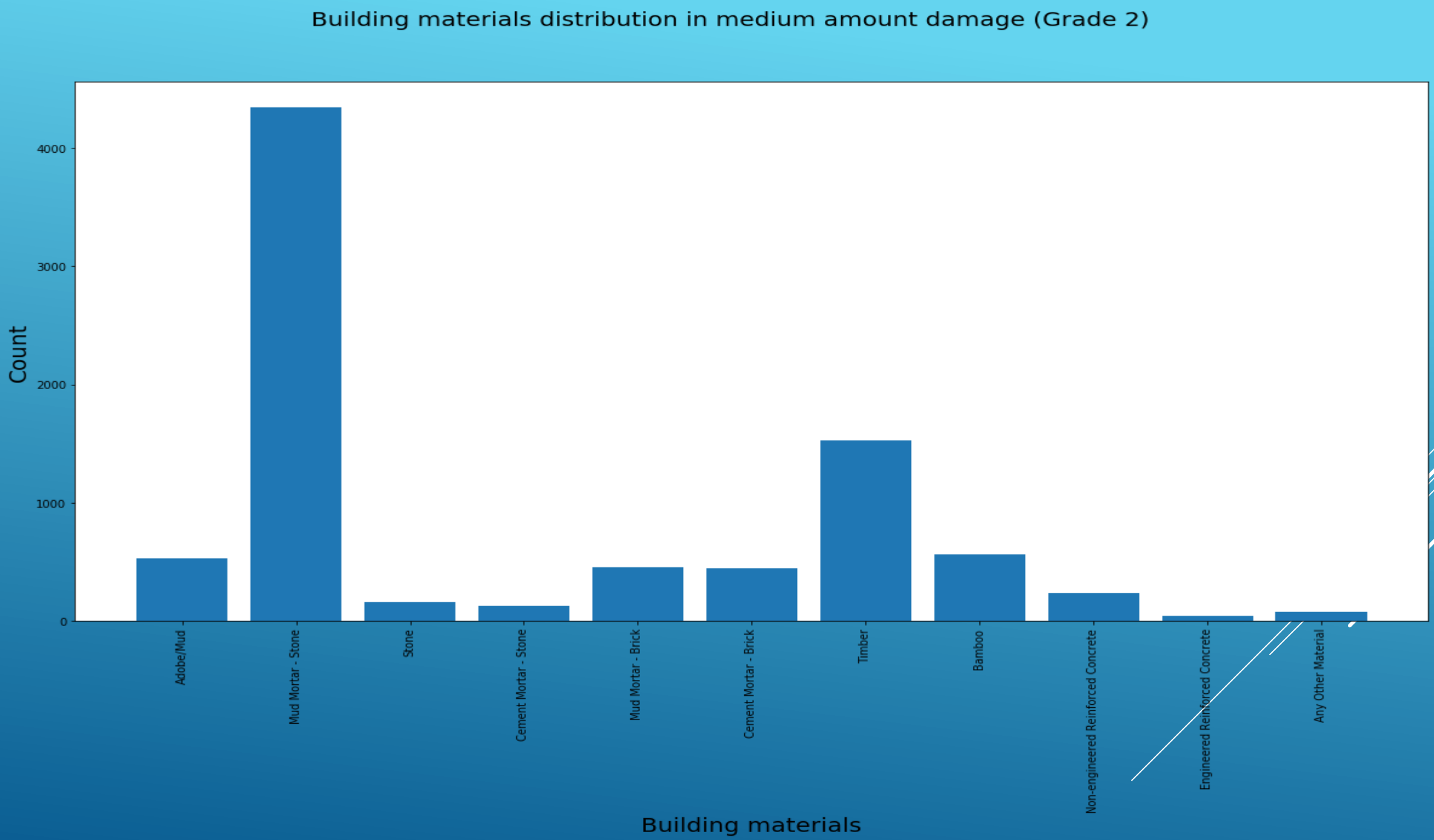
COMPARISON OF AVERAGE DAMAGE

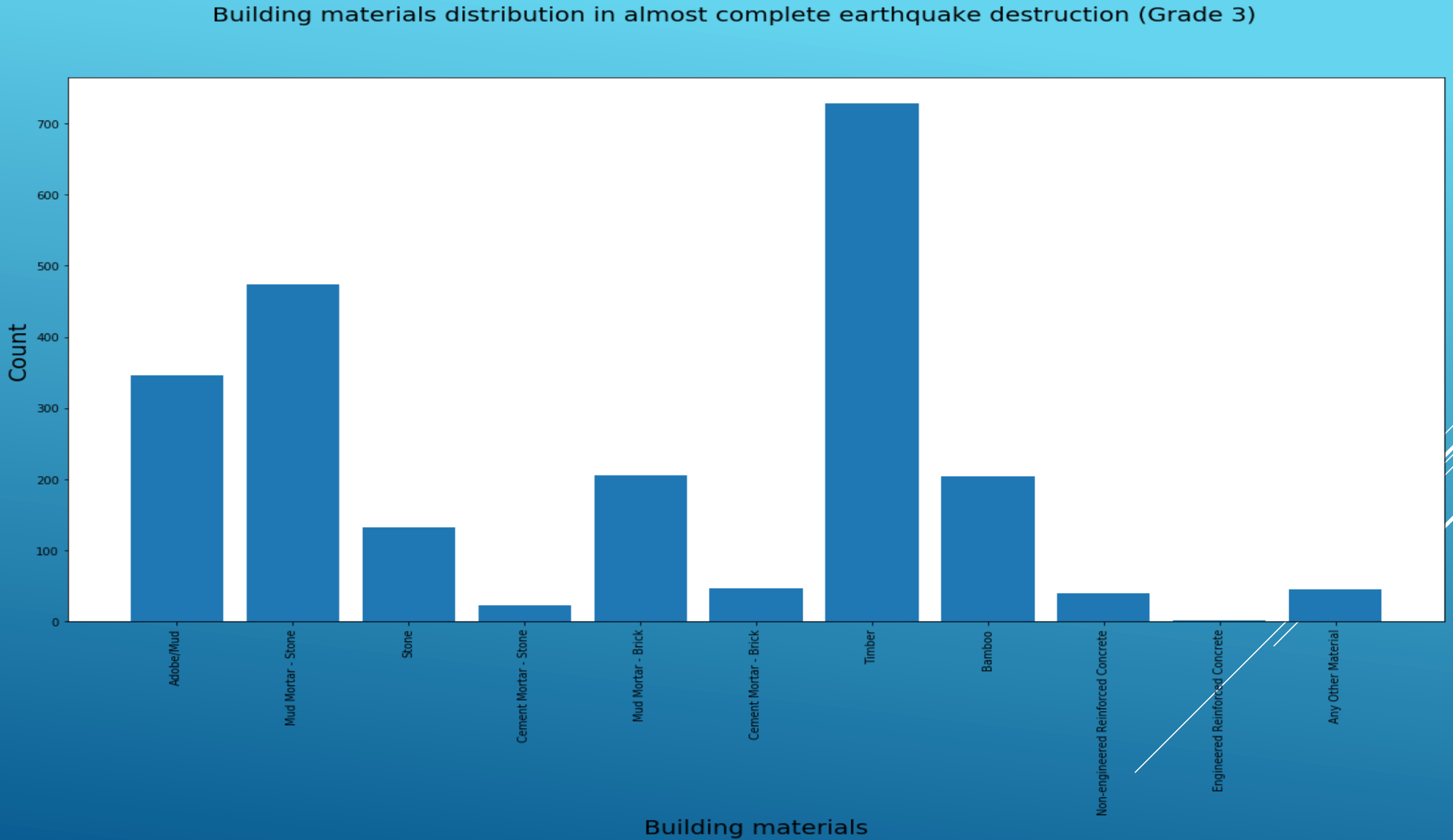
	Material Type	Not_Used	Used
0	Adobe/Mud	2.24	2.36
1	Mud Mortar - Stone	1.94	2.34
2	Stone	2.24	2.42
3	Cement Mortar - Stone	2.25	1.93
4	Mud Mortar - Brick	2.24	2.25
5	Cement Mortar - Brick	2.29	1.74
6	Timber	2.28	2.16
7	Bamboo	2.26	2.10
8	Non-engineered Reinforced Concrete	2.27	1.78
9	Engineered Reinforced Concrete	2.26	1.32
10	Any Other Material	2.25	2.15

Table illustrating average damage for each building material


Overall Distribution of each material for each damage grade
Damage Grade
1
2
3
26
24
111
237
37
96
29
332
127
5
306
525
72
562
441
130
40
454
4342
234
162
1527
346
45
204
47
23
2
205
474
39
132
728
Adobe/Mud
Any Other Material
Bamboo
Cement Mortar - Brick
Cement Mortar - Stone
Engineered Reinforced Concrete
Mud Mortar - Brick
Mud Mortar - Stone
Non-engineered Reinforced Concrete
Stone
Timber
Building Material
4000
3200
2400
1600
800
0

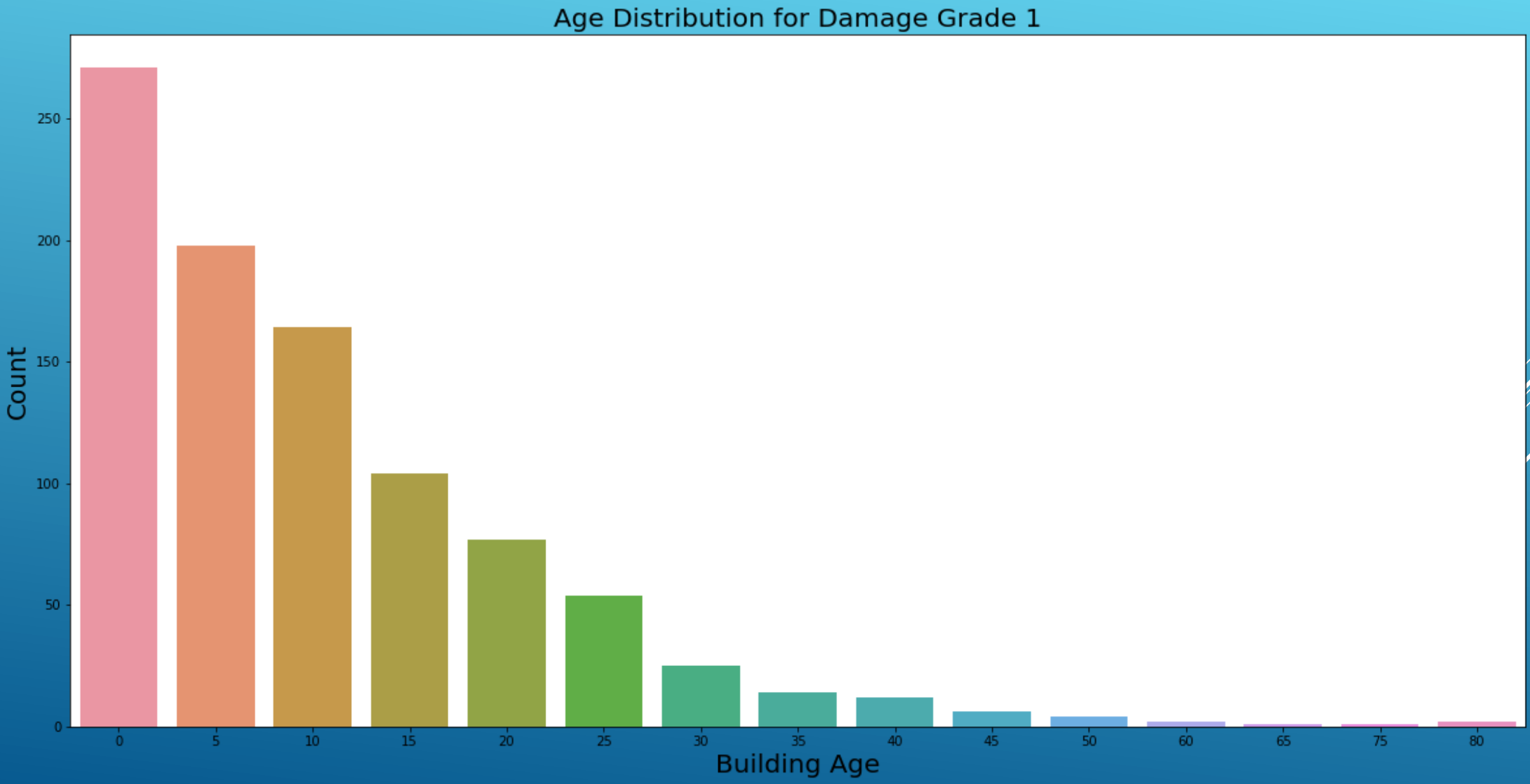

Building materials distribution in low damage (Grade 1)
Count
0
50
100
150
200
250
300
Adobe/Mud
Mud Mortar - Stone
Stone
Cement Mortar - Stone
Mud Mortar - Brick
Cement Mortar - Brick
Timber
Bamboo
Non-engineered Reinforced Concrete
Engineered Reinforced Concrete
Any Other Material
Building materials


Building materials distribution in medium amount damage (Grade 2)
Count
0
1000
2000
3000
4000
Adobe/Mud
Mud Mortar - Stone
Stone
Cement Mortar - Stone
Mud Mortar - Brick
Cement Mortar - Brick
Timber
Bamboo
Non-engineered Reinforced Concrete
Engineered Reinforced Concrete
Any Other Material
Building materials

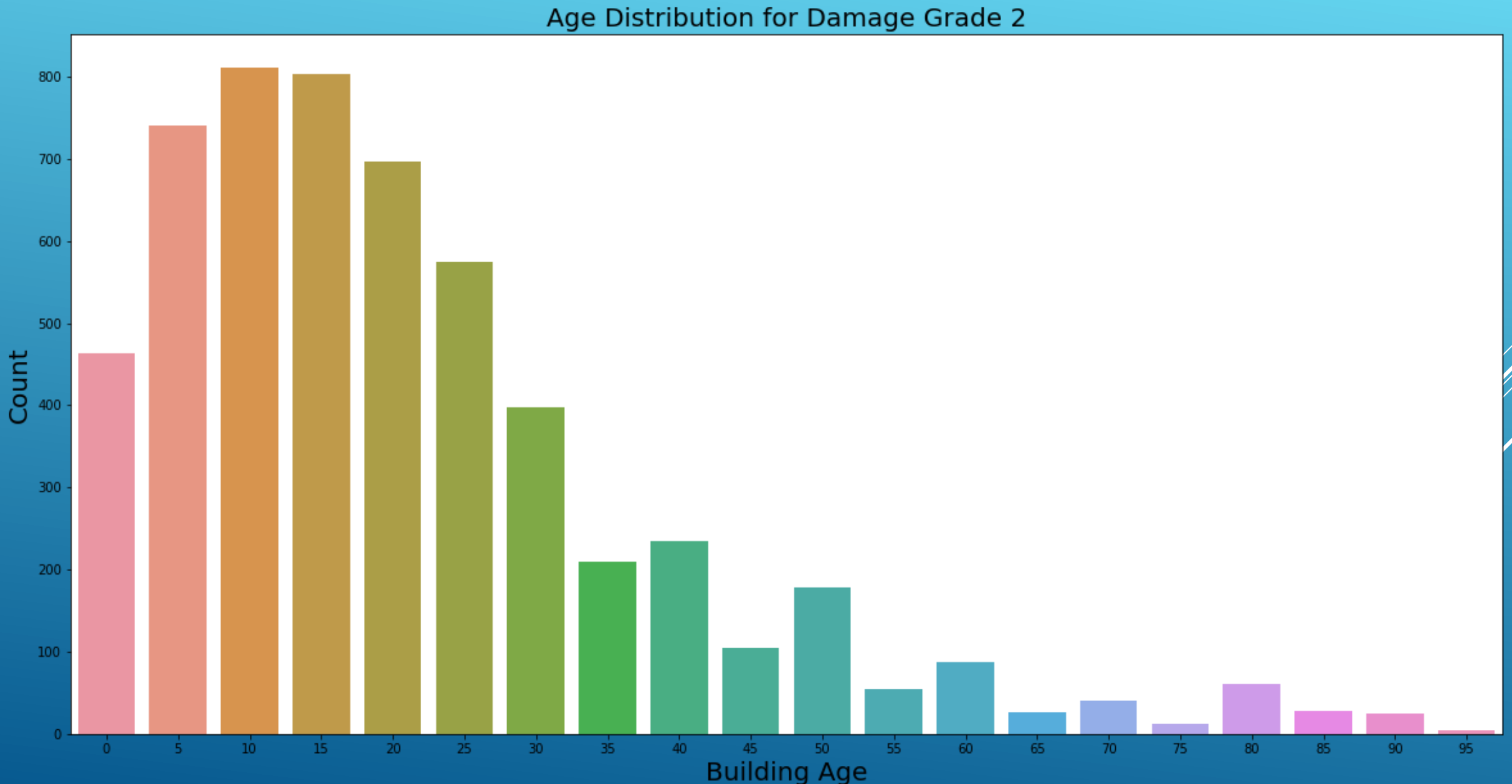

Building materials distribution in almost complete earthquake destruction (Grade 3)
Count
0
100
200
300
400
500
600
700
Adobe/Mud
Mud Mortar - Stone
Stone
Cement Mortar - Stone
Mud Mortar - Brick
Cement Mortar - Brick
Timber
Bamboo
Non-engineered Reinforced Concrete
Engineered Reinforced Concrete
Any Other Material
Building materials

HOW DOES BUILDING AGE RELATE TO DAMAGE CAUSED?

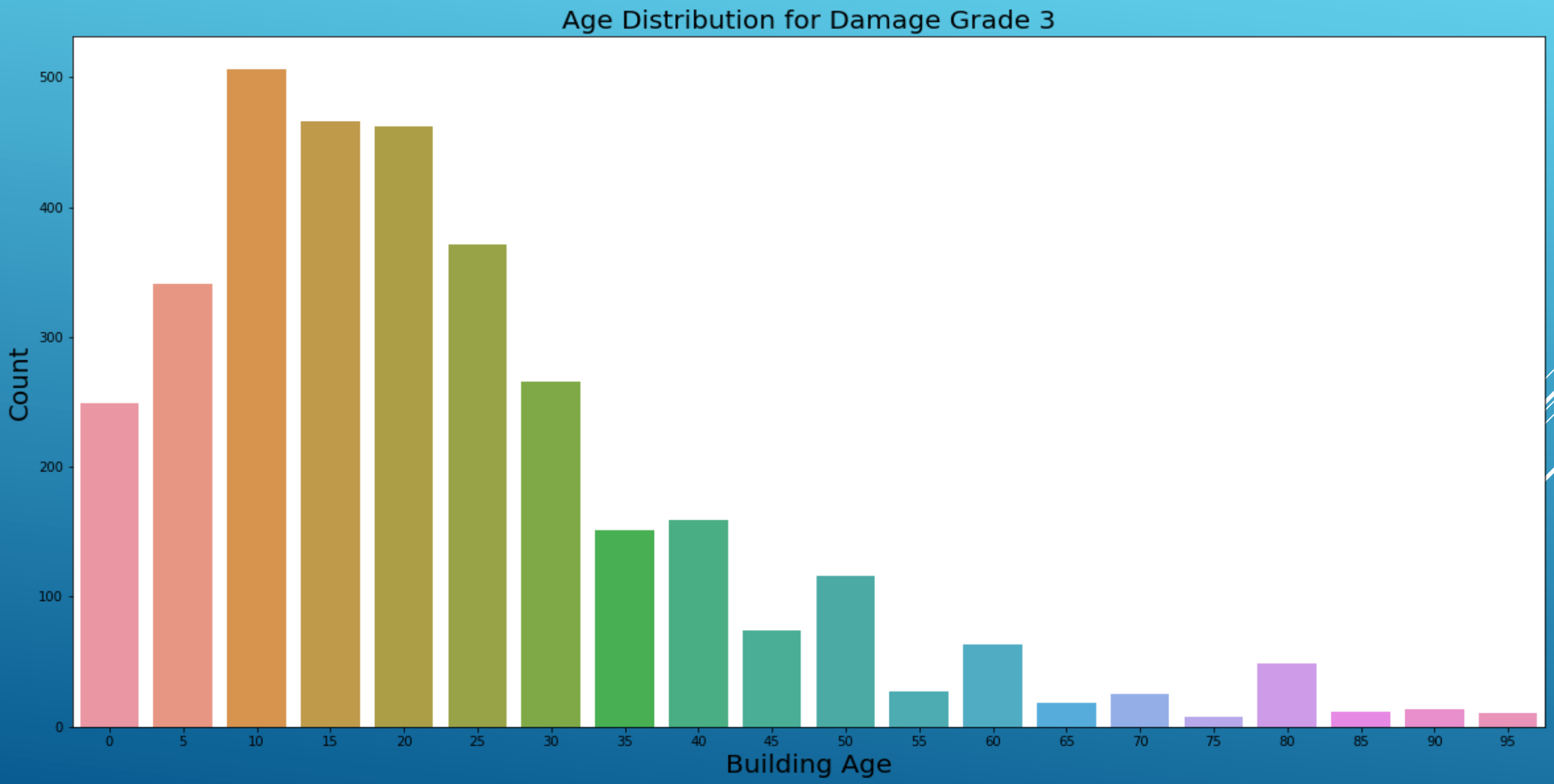
LOW DAMAGE GETTING LESS WITH AGE INCREASE



POSITIVE SKEW FOR MEDIUM DAMAGE



POSITIVE SKEW FOR COMPLETE DAMAGE

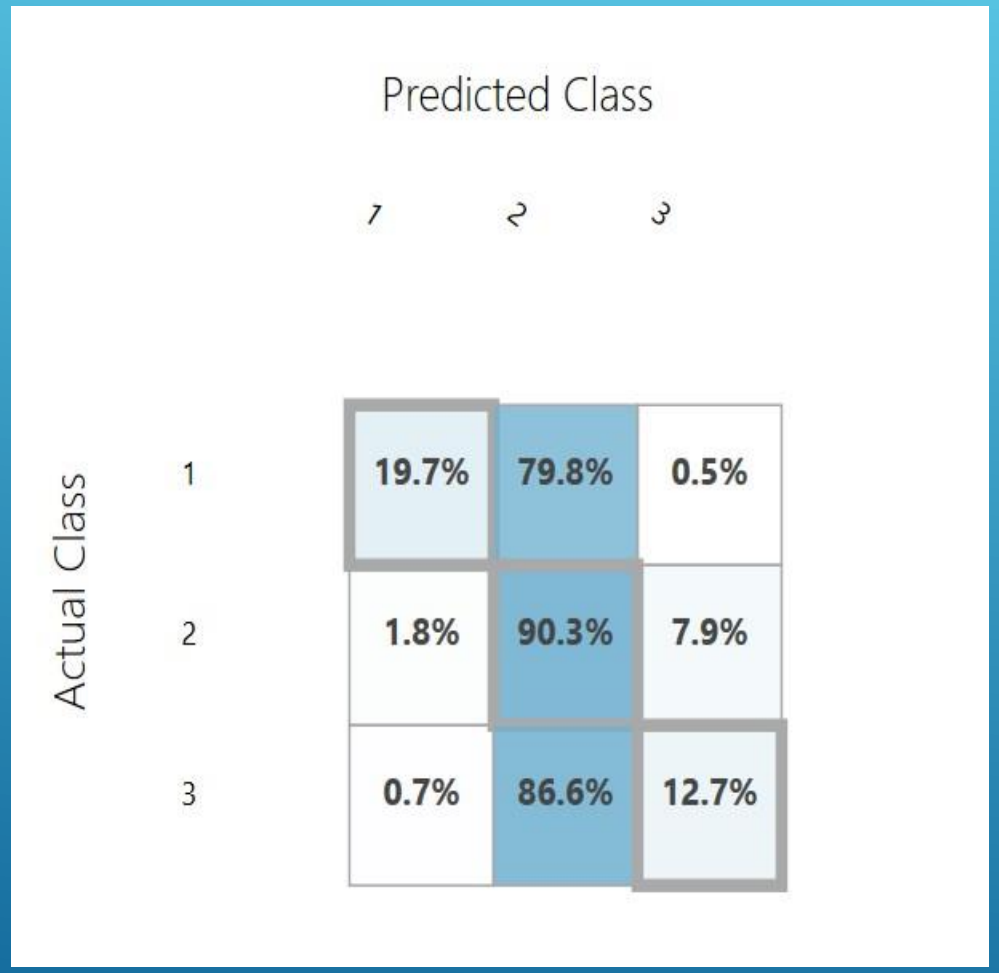


CONCLUSIONS

SUMMARY POINTS

- **Medium level earthquake damage count are the highest**
- **Overall, mud mortar stone material is most vulnerable to all damage levels**
- **Most damages are concentrated on buildings aged 10 to 20 years old**

RECOMMENDATIONS



- **Design and implement machine learning model to predict building vulnerability**
- **Prediction results will allow Nepalese authorities to plan and do advance preventive works**

THANK YOU