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## **DEDICATION**

The thesis is dedicated to the memory of my father **Abdul Haye Khan** (1948 - 2018) who had been the source of inspiration for all my achievements.

## ABSRTACT

Bangladesh is an earthquake prone country as it lies along the border of the Eurasian and Indo-Australian plates, where earthquakes of comparatively uniform intensity are generated at regular intervals. This increase in earthquake activity is an indication of fresh tectonic activity or propagation of fractures from the adjacent seismic zones. In the light of these after various researches upgraded BNBC 2015 has been divided Bangladesh into four seismic zones, namely Zone - 4, Zone - 3, Zone - 2, Zone - 1 being the most severd to least respectively. The occurrence of earthquakes in an earthquake prone region cannot be prevented. So it is suggested to follow seismic code in order to reduce the loss of life.

The present study is aimed to find out the variation of material costing for two (80 feet and 150 feet height) buildings in four seismic zones of Bangladesh. Framing systems of these two building are considered as dual system reinforced concrete. Earthquake and other load are considered as per BNBC 2015. Constant wind load is considered for these building analyses. Analyses of these building are carried out by using ETABS 2016. Structural design and seismic detailing of various structural elements are done based on as per BNBC 2015. Detail structural drawings are prepared for these buildings to comparisons of material cost. Comparative study has been carried on required materials cost for these building (beams, columns and shear walls) among four seismic zones.

Average reinforcement, required of these structural elements (beams, columns and shears walls) been calculated separately for four seismic zones of Bangladesh. It is found that average reinforcements required per square feet of 150 feet height building are 1.63 kg, 1.87 kg, 2.08 kg and 2.35 kg in Zone -1, Zone -2, Zone -3 and Zone - 4, respectively. On the other hand 1.44 kg, 1.61 kg, 1.76 kg and 2.09 kg reinforcements are required for square feet of 80 feet height building in Zone -1, Zone - 2 , Zone - 3 and Zone - 4, respectively.

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## NOTATIONS

Base Shear	V
Seismic zone Co - efficient	Z
Structural Importance co-efficient	I
Seismic Dead load	W
Response Modification co-efficient	R
Numeric co-efficient/horizontal force factor	C
Time period of the structural	T
Site co-efficient of soil	S
Total height of the structure above the base	H
Structural type co-efficient	Ct
Concentrated lateral force at the top	F <sub>e</sub>
Mass of the building	M
Columns Moment	M <sub>c</sub>
Girders Moment	M <sub>e</sub>
Development length	l <sub>dh</sub>
Yield strength of Reinforcement	f <sub>y</sub>
Dia of bar	d
Compressive strength of concrete	f <sub>c</sub> '

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