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INNOVATIVE CONCEPT ON STRUCTURAL ENGINEERING OF MEGA TALL BUILDINGS: APPLIED TO ONE KILOMETER HIGH CONCRETE SKYSCRAPER & CONCEPT OF CONCRETE REDUCTION FROM SHEAR WALLS OF TALL BUILDINGS

Feroz Alam

Advanced Design Concept, Bangladesh

Structural system of tall buildings have undergone dramatic changes since the demise of the conventional rigid frames in the 1960s as the predominant type of structural system for steel or concrete tall buildings. There are numerous structural lateral systems used in high-rise building design such as shear frames, frames with shear core, framed tubes, tube in tube, super frames which can construct for up to 140 stories. Later developed structural systems like outriggers and the buttress core has allowed for even higher buildings, can design for up to 160 stories. This study is intended to model an advanced structural system for tall buildings which can build taller than the tallest existing one in the world. In this innovative concept, "One Kilometer Mega Structure" analyzed where several parallel shear walls have been arranged in both directions and connected with beams and slabs. The shear walls are continuous down to the base to which they are rigidly attached to form vertical cantilevers. Their high in plane stiffness and strength make them well suited for bracing buildings up to about 278 stories (where drift at top 1930mm, allowable $H/500 = 2000\text{mm}$). Dynamic analysis of this 1 KM tower shows that the habitable floor is at height 723m (Record breaking habitable height at 201 storied) besides, by introducing TMD can make the top habitable. Also it is found by research that, when this structural arrangement is applied to around 831m tall structure

with aspect ratio 8.14:1, no additional structural supporting system is required & habitable floor is at 831m (231 stories). Whereas existing world tallest one have habitable floor at 535m (160 stories). This shear walls arrangement is applicable for tall buildings of any height to avoid additional supports to resist the lateral forces while taking advantage of the creative approach of this concept.

Biography

Feroz Alam has invented a structural concept for mega tall buildings which can build one kilometer tower where no additional structural supporting systems are required like belt truss, outriggers and bracings etc. This structural concept also overcame previous disadvantage of shear lag effects of tube concept. A book (ISBN: 978-3-639-66041-8) published completely on his innovative concept from scholars press omniscryptum germany. He published many articles on tall building structural concepts. He worked as a design engineer in Bangladesh, Saudi Arabia & Dubai where he involved for high-rise building designs (steel & concrete). Presently he is working for advanced design concept in bangladesh as a principal design engineer. He designed a 54 storied building in Doha, Qatar. He is also invented a concept for reduction (around 8 to 10%) of concrete from shear walls of tall buildings without affecting the structural integrity of the buildings.

ferozalamabc@yahoo.com