WIND LOADS FOR TALL BUILDINGS IN SRI LANKA

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ABSTRACT

In the recent past the demand for construction of tall buildings in Sri Lanka has remarkably increased. With the development of technology, the knowledge on the material properties used in the construction work has been improved and the design engineers are compelled to get the maximum use of the engineering properties of materials by optimising the geometrical properties of the structural elements. Therefore the use of correct assessment of the magnitudes of all types of loading applicable to buildings and correct approach to identify the behaviour of the structure for these loads have become compulsory to produce safe and efficient buildings.

It is shown with a detailed study that for zone 3 of Sri Lanka, it is not prudent to use 33 m/s wind speed for the design of tall buildings. It is shown that it would be more appropriate to use a higher velocity since most of the countries with similar risk use at least 38 m/s for the structural design purposes of tall buildings. Since the dynamic behaviour and the associated acceleration will depend on the structural systems, the use of higher wind sped will automatically force the structural design engineer to adopt a better structural form. It will also ensure that the tall buildings constructed in Sri Lanka will be comparable with similar buildings in other parts of the world. It is shown with a case study carried out for a thirty storey building that it is possible to improve the dynamic behaviour of the building with some minor alterations to the structure such as introduction of coupling beam between shear walls. It was also shown that the use of the better computer modelling techniques such as modelling the core with 3-D plane stress elements could give better representation for the lateral load behaviour of the structure so that the structural engineer will be able to assess the dynamic behaviour more accurately. The effects of the outriggers are also investigated.

The study clearly indicated that the use of a higher wind speed would not have considerable cost penalty. On the contrary, the conventional structural system could be further improved either by addition of members or improving the structural modelling techniques.

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