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Ref: Structural Evaluation of 60 m EGERES Mast.

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We have performed the required calculations and reviewed the structural details and design of members for the EGERES 60 m high weather observation mast. The primary objective of this analysis was to verify the code compliance and structural strength capacities of the structural members and connections of the EGERES 60 m mast to resist design wind speeds and atmospheric ice loading acting concurrently on the system.

In this investigation, we have used the American Society of Civil Engineers Minimum Design Loads for Buildings and Other Structures (ASCE 7-2005) norm for ice and wind load calculations and load combinations. Allowable stress design method (ASD) has been used for the actual design evaluation of members and connections of the mast.

Based on the geometrical information of the members and mechanical properties of the materials we have modeled the guy supported mast using the latest Nonlinear version of SAP2000 Analysis and Design software three dimensionally. In order to simulate the actual conditions as close as possible, we have modeled the guy wires as actual "cable" elements which can include catenary action due to self and ice weight. "Cable" elements in SAP2000 allow calculations of large deflections under transverse loading via nonlinear structural analysis. Main pipe sections of the mast were modeled as straight frame members.

Also enclosed system elevation sketch depicts the main geometric parameters and overall dimensions of the guy stayed mast. Seven levels of (4)-6mm diameter guy wires, located at four orthogonal directions, are used to laterally support the main pipe. Also attached are the mast base and the guy anchorage details. A typical connection detail of the main pipe members of the mast is also shown.

The study clarifies that the EGERES 60 m mast system complies with the ASCE 7-05 and ASD design code requirements and has the structural strength to withstand the ice and wind loads shown in the capacity curve.

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