



MET MASTS

WE MEASURE THE WIND

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RAMBOLL

WE MEASURE THE WIND SUPPLY OF MET MASTS

RAMBOLL DESIGNS AND SUPPLIES MET MASTS AND CAN OFFER FULL TURN-KEY SOLUTIONS AS WELL AS COMPLETE MEASURING EQUIPMENT INSTALLED

Since the turn of the century Ramboll has been involved in the supply of guyed masts and self-supporting towers for telecom-communications. More than 25,000 masts and towers have been delivered.

The masts and towers have primarily been designed using circular tubes or round bars. This technology has also been used for the design of met masts, resulting in very cost efficient designs, which also reduce the impact on the measured wind speeds.

The met masts are designed according to the requirements in IEC 61400-12 'Power performance measurements of electricity producing wind turbines'.

Design basis

The primary design driver of met masts is normally the wind load. However, in cold regions, ice load especially in combination with wind can be the governing factor for the design. For more remote areas it can often be a problem to assess the design wind speed and the design ice load.

Ramboll can assist in defining the site specific design parameters.

Mast sections

Standard mast sections with lengths up to 6m and triangular cross section are available with face widths of 0.6m, 1.0m and 1.2m.

Transport

All masts can be transported by truck, and some mast types are even suitable for container transportation.

Life time of the structure

The sections are normally hot dip galvanized with a thickness of 115 microns. This leads to a typical life time of more than 20 years. However, most met masts are only used for shorter periods, and consequently the met masts can be reused by dismounting the masts and erecting them on new sites.

However, it is often necessary to erect the masts with new bolts, guy ropes and tensioners.

Mast base and foundations

The mast base is pinned to the foundation offering a simple mast base foundation that is not sensitive to possible settlements of the

foundation. This mast base solution leads to a lower total cost of mast and foundations. The mast base foundation for soil conditions is a concrete slab with a concrete column supporting the mast bearing. The mast and guy foundations have small dimensions so they can easily be prefabricated and transported to site.

In Europe, Ramboll can deliver both prefabricated mast and guy foundations. Also solutions for rock conditions are available as standard solutions.

Climbing the met mast

A climbing ladder is normally integrated in the structure of the mast. The standard solution includes ladder steps per approx. 30 cm. Steps are solid round bars with a width of approx. 40 cm. A safety rail can be fixed to the steps of the climbing ladder. A safety rail is normally included in Ramboll delivery. Customer specified climbing ladder and cable ladder solutions are possible too.

Instrumentation

Special easy-to-operate IEC 61400-12-1 booms are designed to support anemometers, wind vanes,

temperature & humidity sensors and pressure sensors.

Installation

Depending on the site conditions, different methods for erection and installation can be used:

- Mounting with crane is used in areas with good access roads
- Helicopter is used in remote areas
- Alternatively self-climbing cranes can be an option

Ramboll can also be the supplier

In Europe, Ramboll can offer to supply all equipment designed for the load on the actual site including mast, foundation, booms, guys, tensioners and met equipment, if requested.

In Scandinavia, Ramboll also can offer full turn-key solutions where the mast is delivered including civil works and mast erection on-site - plus met installation, if requested.

Ramboll production network

Ramboll has a network of reliable steel manufacturers - all fulfilling our requirements. The structures are manufactured according to EN 1090 or similar by highly skilled craftsmen and certified welders. All

steel parts are hot dip galvanized. Stainless steel is used for small bolts, U-bolts and special small parts - in order to ensure a longer lifetime.

Ramboll delivery

The normal delivery of Ramboll is the following standards:

- Mast sections, mast base and guy frames
- Combined climbing and cable ladder
- Cast-in part (template not required)
- Anti-climb device
- Lightning rod
- Guy robes and guy tensioners
- All fasteners, bolts etc. required

However, the following can also be delivered:

- IEC booms for sensors
- Safety-rail system
- Aviation lights
- Met equipment
- Solar panels and small wind turbines for supply of power at remote sites
- Power packs (Arctic or Compact), generally required if Sonics are to be installed

Ramboll is a truly multidisciplinary consultancy

Being a multidisciplinary engineering consultancy Ramboll can undertake all engineering services and special analyses that may be needed within the wind energy sector.

- Site surveys before erecting the mast (if not turnkey-project)
- Evaluation of existing masts

Further information

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