BELMAST
METAL WORKS

CATALOGUE OF PRODUCTS

Communication Masts and Towers

Design – Engineering – Manufacturing – Maintenance





The limited liability company «BELMAST» was established on April 13th, 2000 as the specialized metal working enterprise.

The company was founded by large telecommunication firm which in the end of 90s carried out large-scale projects in Latvia and Lithuania. One of those included development of a corporate communication network, including construction of radio relay sites, which integral part were communication towers and masts. As it was a big scale and a long term project, but there were certain difficulties with local manufacturers of such type of products, the decision to organize own production was accepted. Besides, the development of GSM networks in the Baltic was only on the middle of its way.

The Company was run by young and talented managers who managed to gather a capable team in a short time period. In half a year the first tower has been made at a production site in Daugavpils (Latvia).

Owing to high quality of production, the competitive price and marketing policy, BELMAST production at once has made a serious competition to foreign analogues.

In cooperation with the leading construction companies of Latvia and Lithuania BELMAST since 2001 has taken a part in large projects of the Ministries of Defense of Lithuania and Latvia. Tens of communication towers and masts, observation and lighting towers have been produced.

Cooperation with the following GSM operators has begun: BITE and TELE2 (Lithuania), TELE2 (Latvia).

Further activities of the Company have been directed basically to the markets of our east neighbors – Russia and Belarus. Our main Partners are TELE2 and MTS in Russia, Velcom and MTS in Belarus.

Today Belmast production is executed on 11 000m² of manufacturing site, with bridge crane equipment, modern infra-red heating, plasma cutting, extensive stock of machine-tools (including shot blasting equipment, painting and drying chambers). The developed infrastructure and qualified personnel allow to process up to 600 tons of metal a month, which is the capacity BELMAST can hold at the moment.

BELMAST offers its Clients a wide range of production of own manufacture - masts and towers, building bear metal constructions, and also an extensive range of additional services connected with metal working of various degree and complexity.

We are proud, that products made by us are demanded by the largest and respected enterprises of the CIS and the Baltic. Among them there are TELE 2 in Russia, Latvia and Lithuania, Velcom and MTS in Belorussia, BITE in Lithuania, Ministry of Railway Transport and Lentransgaz in Russia and many others.

The BELMAST team is working under the motto «Verbis aut factis», that means “In word and deed”, and guarantees the Clients an individual approach, fast and exact reaction to all inquiries, quality and in time performed work.

The constant multilevel control allows delivering high quality production onto the market. In 2006 the enterprise has received a certificate confirming that the system of quality management completes the requirements of international standard ISO 9001:2000 in the field of designing and manufacturing of metal constructions, towers and communication masts. Annually the enterprise passes audit which purpose is to confirm compliance of the quality management system of the enterprise with the requirements of ISO standard.

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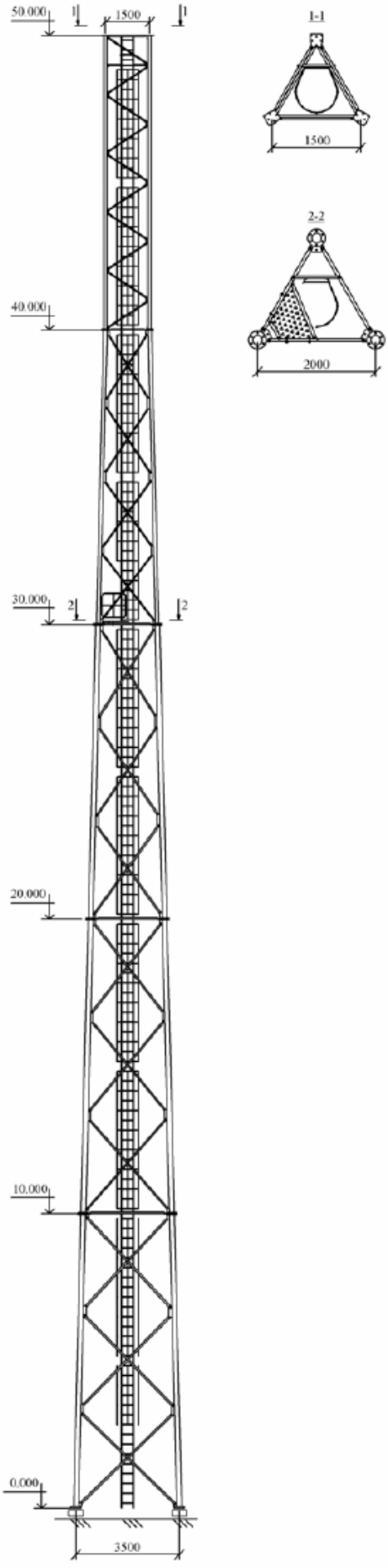
CATALOGUE OF MAIN PRODUCTS:

1. Towers of the **MT** series with altitude from 10.0 to 50.0 metres
2. Towers of the **ST** series with altitude from 50.0 to 90.0 metres
3. Masts of the **SMJ** series with altitude from 10.0 to 40.0 metres
4. Masts of the **SM** series with altitude from 24.0 to 120.0 metres
5. Masts of the **SMU** series with altitude from 20.0 to 36.0 metres
6. Towers of the **AT** series with altitude from 11.0 to 28.0 metres
7. Observation Towers of the **NT** series with altitude 30.0 metres
8. Contact Information

TOWERS OF THE MT SERIES WITH ALTITUDE FROM 10.0 TO 50.0 M



The given series of towers **(MT)** is designed in accordance with the criteria of a construction optimum cost, technology capabilities during production, unification and easiness at assembly and further technical maintenance. In addition to the said, a small size of basement to the tower allows installing it in small sites.

Project codes: MT10-T1, MT20-T2, MT30-T3, MT40-T4, MT50-T5

SCOPE OF APPLICATION

Placement of antennae for base stations of mobile communications
Placements of antennae for radio relay communication networks
Placement of television and radio antennae
Placement of different lighting devices
Placement of CCTV
Placement of navigation, radar and other systems

STANDARD COMPLETION

Bearing constructions for a tower
Stairs for ascent
Construction for fixing the feeders (feeder ways)
Rest platforms
Set of the fixing materials
Assembly documentation

OPTIONAL COMPLETION

Antennae and other technological equipment supports (holders)
Additional rest and service platforms
System of safety to stairs for ascent (rear guardrail, safety profile with carriage or an 8 mm cable)
Cable ladder from tower to container or technology room
Anchor bolts and plates
Aviation lights
System of lightning protection (lightning arrester with lead and fixing elements)
System of protection against unauthorized access, etc.

CORROSION PREVENTION

Anti corrosion surface treatment of the towers is possible under the following schemes:
- painting of constructions;
- Hot Dip Galvanizing (HDG);
- Hot Dip Galvanizing (HDG) and painting.

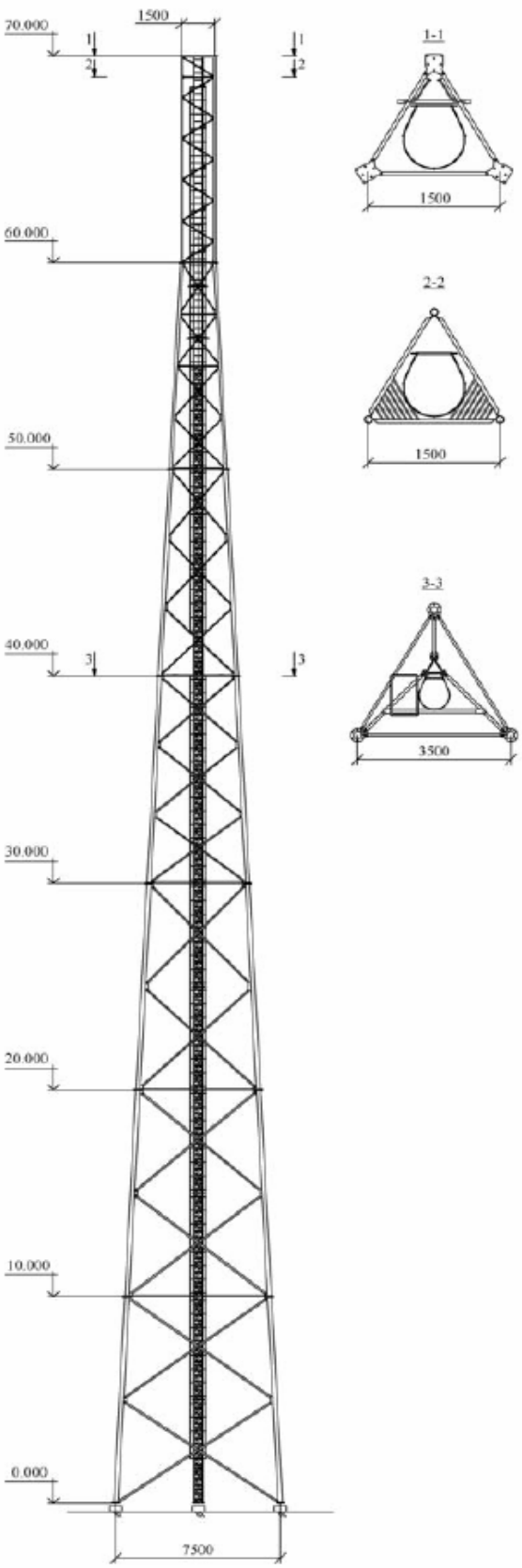
MAIN TECHNICAL PARAMETERS

Altitude range - from 10.0 to 50.0 metres
Maximum area of the available wind load - to 12.0 m2
Maximum weight of valuable load - to 800.0 kg
Maximum wind pressure - to III wind region, as to SNiP 2.01.07-85*
Size of the tower base:
MT10-T1 - 1500 mm;
MT20-T2 - 2000 mm;
MT30-T3 - 2500 mm;
MT40-T4 - 3000 mm;
MT50-T5 - 3500 mm.

DESIGN SOLUTIONS

The towers are composed of unified prefabricated sections. Altitude of each section is 10.0 metres. The upper section is triangular in the plan having a side of scalene triangle, equal to 1.5 metres. The remaining sections - truncated pyramid of triangle section, with belt angle of 2.10. Section belts are made of round tubes with increase of the cross-section profile from top section downwards. Section grid is made of quadratic cross-section profiles. The section joints are of flange type on bolts. Cross stay fixing of grid to the section belts is made by bolts. Stairs for ascent are placed inside the tower. Stairs are fixed to elements of the tower grid with help of special brackets. In the same way, parallel to the stairs, there are cable feeders or fixing of the antennae feeders and power supply cables inside the tower trunk.

TOWERS OF THE ST SERIES WITH ALTITUDE FROM 50.0 TO 90.0 M



The given series of towers **(ST)** is suggested to be used in cases when there is a need to install the technological equipment on altitudes ranging from 50.0 to 90.0 metres. At development of the series a requirement to increase the valuable wind loads without deterioration of the required strength features of towers. The main elements and units are designed basing on unification, easiness at assembly and further technical maintenance.

Project codes: ST50-T5, ST60-T6, ST70-T7, ST80-T8, ST90-T9

SCOPE OF APPLICATION

Placement of antennae for base stations of mobile communications
Placements of antennae for radio relay communication networks
Placement of television and radio antennae
Placement of navigation, radar and other systems

STANDARD COMPLETION

Bearing constructions for a tower
Stairs for ascent
Construction for fixing the feeders (feeder ways)
Rest platforms (from 1 to 3)
Set of the fixing materials
Assembly documentation

OPTIONAL COMPLETION

Antenna holders
Additional rest and service platforms
System of safety to stairs for ascent (rear guardrail, safety profile with carriage or an 8 mm cable)
Feeder bridge from tower to container or technology room
Anchor bolts and plates
Aviation lights
System of lightning protection (lightning arrester with lead and fixing elements)
System of protection against unauthorized access, etc.

CORROSION PREVENTION AND WARNING PAINTING

Protection against corrosion of metal constructions of the towers of given series is possible under the following schemes:
- painting of constructions;
- Hot Dip Galvanizing (HDG);
- Hot Dip Galvanizing (HDG) and painting.

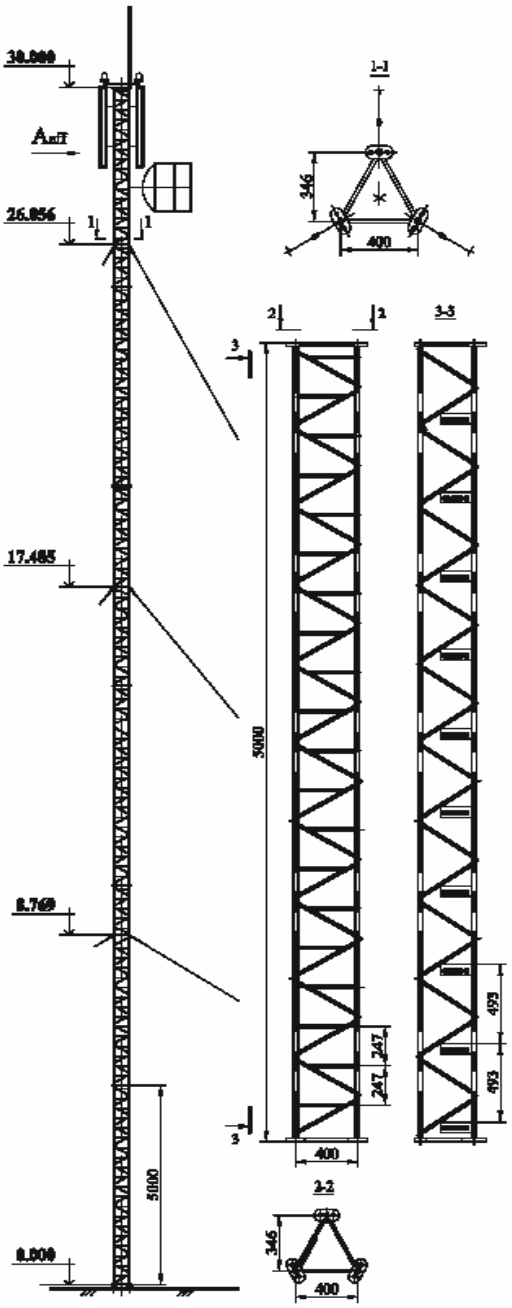
MAIN TECHNICAL PARAMETRES

Altitude range - from 50.0 to 90.0 metres
Maximum area of the available wind load - to 16.0 m2
Maximum weight of valuable load - to 1100.0 kg
Maximum wind pressure - to IV wind region, as to SNiP 2.01.07-85*
ST50-T5 - 5500 mm;
ST60-T6 - 6500 mm;
ST70-T7 - 7500 mm;
ST80-T5 - 8500 mm;
ST90-T5 - 9500 mm.

DESIGN SOLUTIONS

The towers are composed of unified prefabricated sections. Altitude of each section is 10.0 metres. The upper section is triangular one in the plan having a side of scalene triangle, equal to 1.5 metres. The remaining sections - truncated pyramid of triangle section, with belt angle of 2.90. Section belts are made from round tubes with increase of the cross-section profile from top section downwards. Section grid is made of quadratic cross-section profiles. Type of the section joints - flange joints on bolts. Stanchion fixing of grid to the section belts is by bolts. Inside the tower a grid trunk of triangular cross-section is situated having the edge side of 400 mm. To the trunk via special brackets stairs for ascent and elements for fixing antennae feeders and power supply cables (two independent tracks) are situated. Towers of the said series are completed with rest platforms.

MASTS OF THE SMJ SERIES WITH ALTITUDE FROM 10.0 TO 40.0 M



The given series of masts **(SMJ)** is used by many GSM providers as basic construction to locate the GSM equipment on sites where there are no restrictions for space occupied. Such masts are simple for instalment and further technical maintenance. Taking into account a small number of bolt joints maintenance costs caused by regular control of the bolt torque are significantly reduced. Masts of the said series present an optimum solution, including expedient ratio of bearing capacity, construction price and budget for instalment thereof.

Project codes: SMJ10-W2…….. SMJ40-W8

SCOPE OF APPLICATION

Placement of base stations of mobile communications
Placements of antennae for radio relay communication networks
Placement of television and radio antennae
Placement of CCTV systems and other equipment

STANDARD COMPLETION

Bearing constructions for a mast
Details for fixing the strains
Cable with metal core to strains
Set of the fixing materials
Composition documentation

OPTIONAL COMPLETION

Antenna holders
Safety system to stairs for elevation of people (safety profile or an 8 mm cable)
Anchor bolts and plates
System of lightning protection (lightning arrester with lead and fixing elements)
Aviation lights
Feeder bridge for transfer from cable-ductings to container or technology room

CORROSION PREVENTION AND SIGNAL PAINTING

Protection against corrosion of metal constructions of the masts of given series is possible under the following schemes:
- painting of constructions;
- Hot Dip Galvanizing (HDG);
- Hot Dip Galvanizing (HDG) and painting.

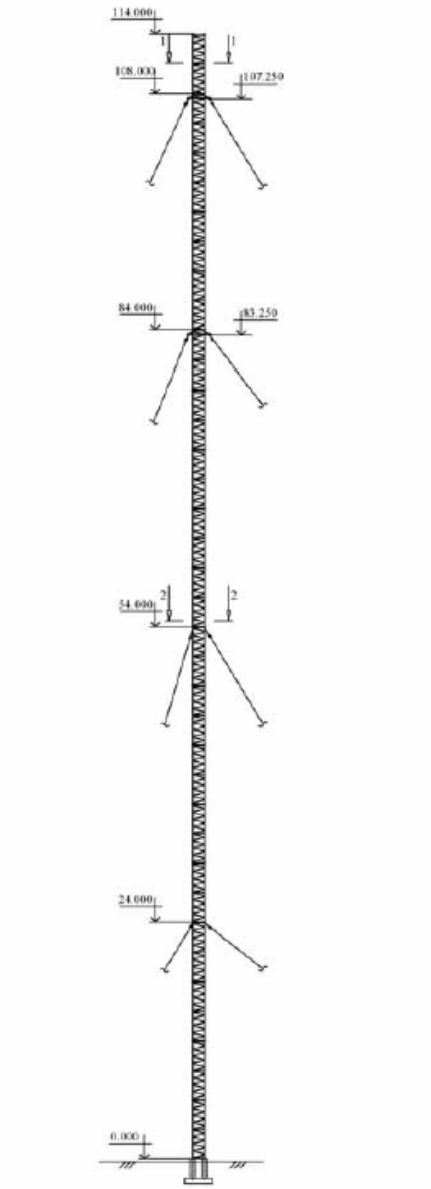
MAIN TECHNICAL PARAMETRES

Altitude range - from 10.0 to 40.0 metres
Maximum area of the available wind load - to 6.0 m2
Maximum weight of valuable load - to 350.0 kg
Maximum wind pressure - to IV wind region, as to SNiP 2.01.07-85*

DESIGN SOLUTIONS

The masts are composed of unified welded sections. Altitude of each section is 5.0 metres. All the sections have regular cross-section, triangular one in the plan, having a side of equilateral triangle, equal to 0.4 metres. Section belts are made of round steel. Section grid is also made of round steel. Type of the section joints - flange joints on bolts.

MASTS OF THE SM SERIES WITH ALTITUDE FROM 24.0 TO 120.0 M



The given series of masts **(SM)** is used by many GSM providers as basic construction to locate the GSM equipment on sites where there are no restrictions as to space occupied. Such masts are simple for instalment and further technical maintenance. Taking into account a small number of bolt joints maintenance costs caused by regular control of the bolt torque are significantly reduced. Masts of the said series present an optimum solution, including expedient ratio of bearing capacity, construction price and budget for instalment thereof.

Project codes: SM24-W4; SM30-W5; SM36-W6; SM42-W7; SM48-W8; SM54-W9; SM60-W10; SM66-W11; SM72-W12; SM78-W13; SM84-W14; SM90-W15; SM96-W16; SM102-W17; SM108-W18; SM114-W19; SM120-W20

SCOPE OF APPLICATION

Placement of base stations of mobile communications
Placements of antennae for radio relay communication networks
Placement of television and radio antennae
Placement of navigation and radar communication networks

STANDARD COMPLETION

Bearing constructions for a mast
Details for fixing the strains
Cable with metal core to strains
Set of the fixing materials
Assembly documentation

OPTIONAL COMPLETION

Antenna holders
Safety system to stairs for elevation of people (safety profile or an 8 mm cable)
Anchor bolts and plates
System of lightning protection (lightning arrester with lead and fixing elements)
Aviation lights
Feeder bridge for transfer from cable-ductings to container or technology room
System of protection against unauthorized access, etc.

CORROSION PREVENTION AND SIGNAL PAINTING

Protection against corrosion of metal constructions of the masts of given series is possible under the following schemes:
- painting of constructions;
- Hot Dip Galvanizing (HDG);
- Hot Dip Galvanizing (HDG) and painting.

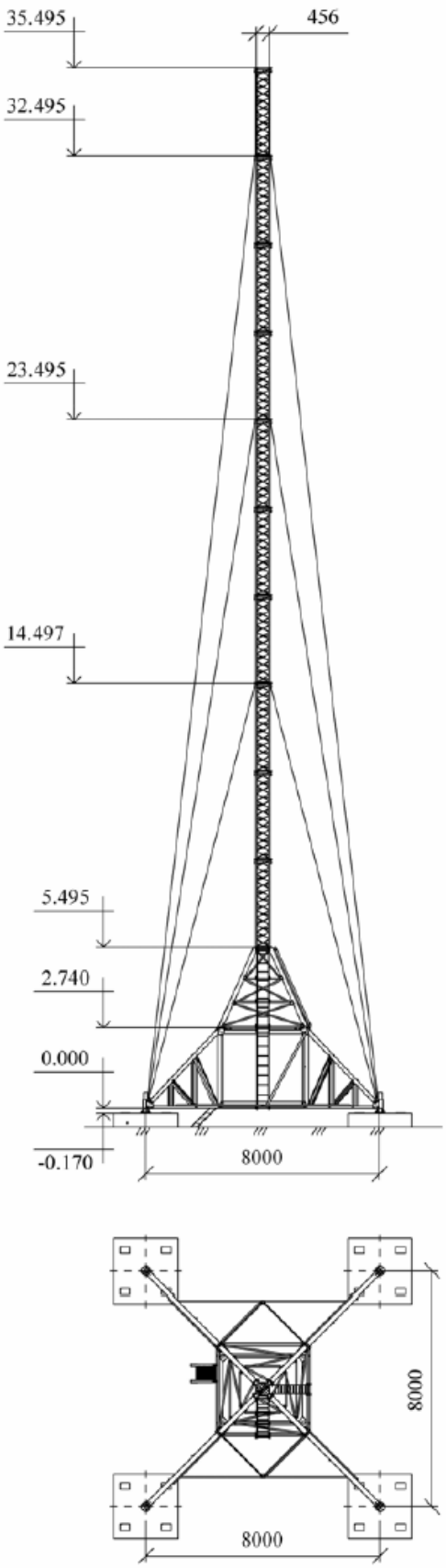
MAIN TECHNICAL SETTINGS

Altitude range - from 24.0 to 120.0 metres
Maximum area of the available wind load - to 14.0 m2
Maximum weight of valuable load - to 800.0 kg
Maximum wind pressure - to IV wind region, as to SNiP 2.01.07-85*

DESIGN SOLUTIONS

The masts are composed of unified welded sections. Altitude of each section is 6.0 metres. All the sections have regular cross-section, triangular one in the plan, having a side of equilateral triangle, equal to 1.2 metres. Section belts are made from round steel. Section grid is also made from round steel. Type of the section joints - flange joints on bolts. Stanchion fixing of grid to the section belts is by welding. Within the mast trunk an ascent stairs are situated. The stairs are fixed to the mast grid elements and are installed in the plant. In the same way, parallel to the stairs, within the mast trunk cable-ductings are located for fixing of antennae feeders and power supply cables. Towers of the said series may be completed extra with firmness triangles and additional bars of strains dependent on altitude, quantity and type of equipment to be installed.

MASTS OF THE SMU SERIES WITH ALTITUDE FROM 20.0 TO 36.0 M



The given series of masts (SMU) is designated for application in the events when radio transmitting equipment must be installed of small areas within 36.0 metres. The main feature of universal masts is a possibility to use them as foundations to inventory bearing plates. The plates are installed on the ground surface without violation to the area cover. Bearing junction of the mast allows regulating the basis in vertical face in relation to bearing plates. In case of necessity the universal mast may be dismantled and mounted on a new site with given inventory plates and minimum expenditures for fundamental operations. Little effort on bearing parts of the mast allows placing the said constructions on the roofs of buildings and edifices without significant enforcement of the structure. The mast is composed from light elements that allow mounting the structures by application of self-lifting mechanisms. As an additional completion to a mast the container may be ordered to store telecommunication equipment. Container is installed on the mast bearing constructions and there is no need for additional foundation thereto. Dimensions of the built-in container (10ft) are 2989x2435x2591mm. The container may be supplied as in basic completion as well as with venting, air-conditioning and heating systems at the option of customer.

Project codes: SMU20-W5 ..... SMU36-W10

SCOPE OF APPLICATION

Placement of base stations of mobile communications
Placements of antennae for radio relay communication networks
Placement of television and radio antennae
Placement of antennae for the Internet providers
Placement of CCTV systems and other equipment

STANDARD COMPLETION

Bearing constructions for a mast
Details for fixing the strains
Cable with metal core to strains
Set of the fixing materials
Composition documentation

OPTIONAL COMPLETION

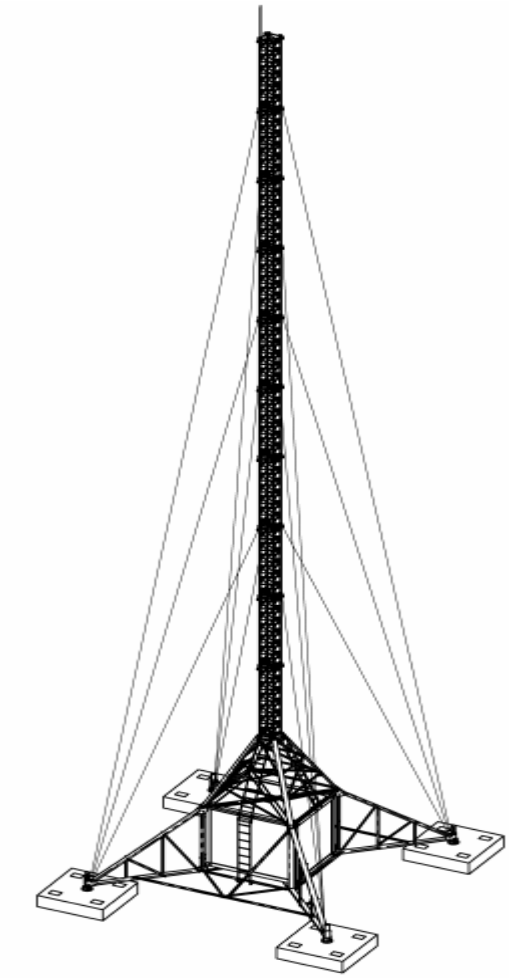
Antenna holders
Safety system to stairs for elevation of people (safety profile or an 8 mm cable)
Aviation lights
System of lightning protection (lightning arrester with lead)
Container for storage of equipment
Stairs to elevate to the container
Inventory bearing plates

PROTECTION AGAINST CORROSION

Protection against corrosion of metal constructions of the masts of given series is possible under the following schemes:
- Hot Dip Galvanizing (HDG);
- Hot Dip Galvanizing (HDG) and painting.

MAIN TECHNICAL SETTINGS

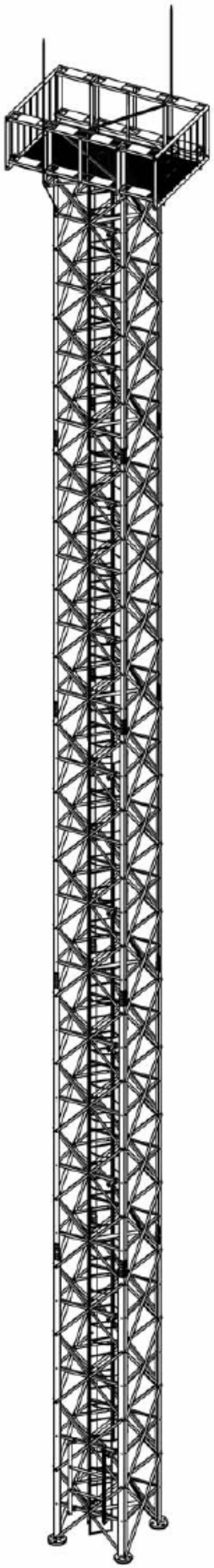
Altitude range - from 20.0 to 36.0 metres
Maximum area of the available wind load - to 3.0 m2
Maximum weight of valuable load - to 200.0 kg
Maximum wind pressure - to III wind region, as to SNiP 2.01.07-85*



DESIGN SOLUTIONS

The masts of SMU series are composed of unified prefabricated sections. Top part of the mast (over the +5.500 metre mark) is made like a grid trunk on strains. The grid trunk is made of spatial sections, of regular cross-section with base of 0,456 metres. Altitude of each section is 3.0 metres. Section belts are made from round tubes. Section grid is made from round steel. Mast trunk is unfixed by strains from hot-dip-galvanized cable of double ply Ж 14 mm. Lower part of the mast in pyramidal form with transition to term bearings with foundation base of 8.0 metres. Bearing junction of the mast allows for regulating the base in vertical plane in relation to bearing plates. Elements of the lower part are made from U and L profiles. Joints of the mast elements - with bolts, strain fixing to bearing parts of the mast is performed by compressions allowing to rearrange the strains for different altitudes of the mast. Mast construction allows installing the typical container bearing equipment. For this purpose inventory fixings are provided. For the people to rise towards technological equipment trods on the mast trunk are envisaged. Until the mark of +2700 m the cable-ducting for fixing of antennae feeders and power supply cables are laid. As a typical solution for bearing elements of the mast reinforced ferroconcrete plates are applied.

TOWERS OF THE AT SERIES WITH ALTITUDE FROM 11.0 TO 28.0 M



The given series of towers (**AT**) is designed for instalment of various lighting devices, CCTV cameras, notification systems, visual and signal indication panels, etc. Location of positions of visual surveillance and perimeter control are possible as well. The towers are equipped with platforms with guardrails on the outside perimeter for instalment and further technical maintenance of equipment. In addition to Standard platforms, towers may be completed with other platforms, which are developed in accordance with requirements of a particular customer.

Project codes: AT11-T2, AT17-T3, AT22-T4, AT28-T5

SCOPE OF APPLICATION

Placement of different lighting devices
Placement of CCTV cameras
Placement of sound and visual notification systems
Placement of signal identification systems
Placement of navigation and profile marks

STANDARD COMPLETION

Bearing constructions for a tower
Stairs for ascent
Standard platform with guardrails for equipment mounting and maintenance (dimension 2000x3000 mm)
Set of the fixing materials
Assembly documentation

OPTIONAL COMPLETION

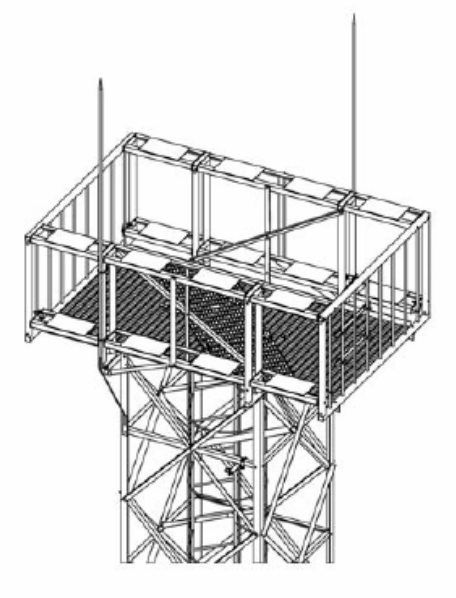
Supports to install technological equipment
System of safety to stairs for ascent (rear guardrail, safety profile with carriage or an 8 mm cable)
Anchor bolts and plates
Aviation lights
System of lightning protection (lightning arrester with lead)
Individual platforms
Cable fixing constructions (cable-ducting)
Feeder bridge for transition from tower to container or technology room

CORROSION PREVENTION

Protection against corrosion of metal constructions of the masts of given series is possible under the following schemes:
- painting of structures;
- Hot Dip Galvanizing (HDG);
- Hot Dip Galvanizing (HDG) and painting.

MAIN TECHNICAL SETTINGS

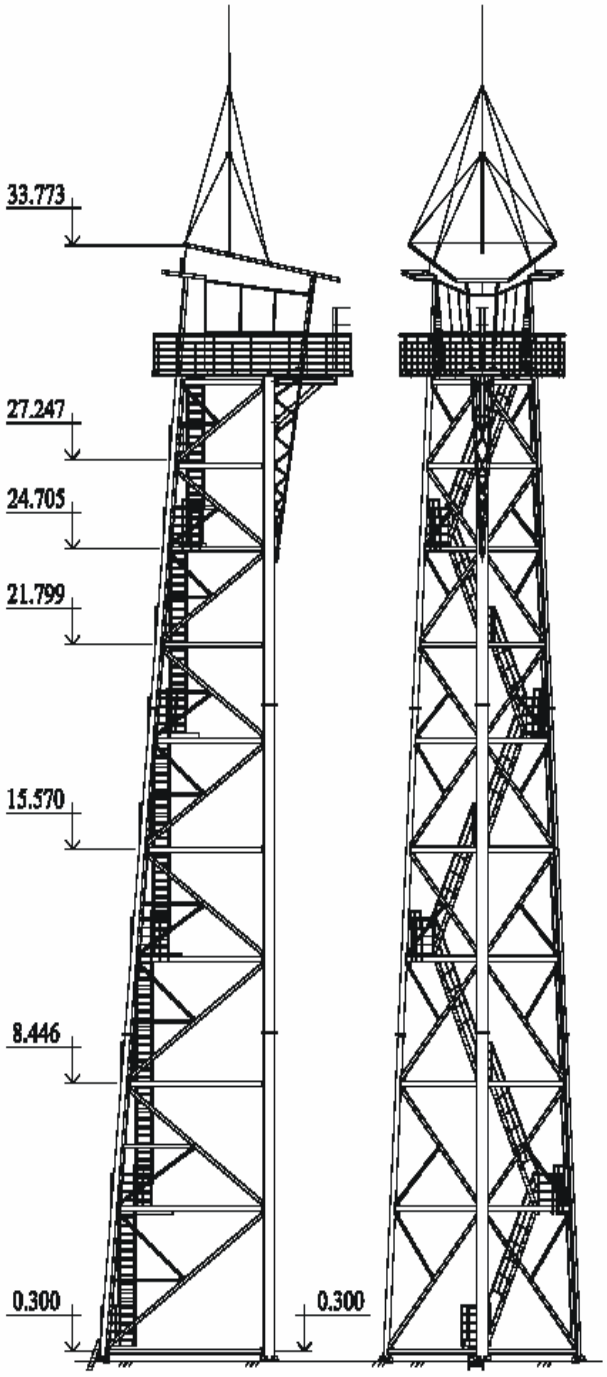
Altitude range - from 11.0 to 28.0 metres
Maximum area of the available wind load - to 6.0 m2
Maximum weight of valuable load - to 500.0 kg
Maximum wind pressure - to IV wind region, as to SNiP 2.01.07-85*



DESIGN SOLUTIONS

Towers are composed of completely prefabricated sections. All the sections are with constant cross-section, regular in the plan, with side of square equal to 1.4 metres. Section belts are made from L profiles with increase of the profile cross-section from upper section towards the lower one. Section grid also is made from L profiles. Type of the section joints - joints on bolts through rims. Stanchion fixing of grid to the section belts is by bolts. Within the tower trunk stairs are placed for ascent. Stairs are fixed to the tower grid elements via special brackets. In the same way within the tower trunk a cable-ducting to fix signal cables and power supply cables may be placed. On the top of tower a type platform with guardrail is installed.

OBSERVATION TOWERS OF THE NT SERIES WITH ALTITUDE 30.0 M



Observation towers (NT) were developed according to the architecture design of the "Arhitektonika" company and were installed within the project framework for reconstruction of the eastern border of the Republic of Latvia.

The said towers are designed for placement of the visual observation and perimeter control pickets. Moreover on the tower platform equipment for video- surveillance and TV sets as well as radio transmitting equipment for transmittance of information to the central observance points may be located.

Observance towers are equipped by mid-flight stairs with interim landings and banister along entire height. On the top mark a platform with guardrail and observance cabin are installed. Observance cabin is represented by completely heat-insulated room with glass packets along the cabin perimeter. Windows are equipped with sun protection persiennes. In a separate room a cabinet with equipment and server space. On option in the said premises a biotoilet may be installed. Cabins are completed with air-conditioning and air heating system, in-flow and out-flow ventilation system, lighting, non-stop power supply system. All the windows in cabin are installed under the negative angle

Project code: NT30-T3

SCOPE OF APPLICATION

Placement of visual observation systems
Placement of positions to control the perimeter
Placement of video observation equipment

STANDARD COMPLETION

Bearing constructions for a tower
Ascent stairs with intermediate platforms to elevate the people and equipment
Platform with guardrails along the perimeter of observance cabin (dimension 6536x7843 mm)
Observance cabin with interior finish
Steel protection persiennes (from the door)
Set of the fixing materials
Assembly documentation

OPTIONAL COMPLETION

Supports to install antennae and other technological equipment
Cable fixing constructions (cable channels or stairs)
Input and output ventilation system for the observance cabin
Air-conditioning and air heating system for the observance cabin
Cable wiring and lighting at the customer's option
Non-stop power supply system
Set of furniture in the observance cabin
Lighting protection system
Aviation lights
Anchor bolts and plates

CORROSION PREVENTION

Protection against corrosion of metal constructions of the masts of given series is possible under the following schemes:
- painting of structures;
- Hot Dip Galvanizing (HDG);
- Hot Dip Galvanizing (HDG) and painting.

MAIN TECHNICAL SETTINGS

Altitude range - 30.0 m (platform level)
Maximum wind pressure - to IV wind region, as to SNiP 2.01.07-85*
Ice formation region - III black-frost region, as to SNiP 2.01.07-85*

DESIGN SOLUTIONS

Observation towers are composed of completely prefabricated sections. Altitude of each section is 10.0 metres. All the sections are triangular in the plan. Section belts are made from round tubes. Section grid is made from quadratic cross-section profiles with fashion appliances for fixing to the tower belts. Type of the section joints - flange joints on bolts. Stanchion fixing of grid to the section belts is by bolts. Within the tower trunk a mid-flight stairs are placed with interim landings for ascent of people and of equipment. Stairs are fixed to the tower grid elements via brackets and bearing parts. On the upper mark a prefabricated platform and observance cabin is installed. The cabin is supplied tied-in with dismantled roof and overhang.

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