

**TELECOMMUNICATION**

**INFRASTRUCTURE**

**SOLUTIONS**



**GRUPPE**

**TELECOMMUNICATION INFRASTRUCTURE SOLUTIONS**

# OUR SPECIALITIES

- 01** Highly skilled and experienced teams have been erecting telecommunication towers up to 100 metres. All team members have been registered with CIDB to ensure their compliance with safety standards in this challenging skill.
- 02** Specialised Civil Works teams who have worked closely with tower erection and have equally long and intricate experience of the demands particularly relating to tower erection.
- 03** Telecommunication cabin installers who have wide and varied experience of the requirements of our telco clients and their telecommunication equipment.
- 04** Specialized in M & E teams who have received training in the various telco equipments and are skilled technically in their installation, commissioning and testing.
- 05** OSP – Civil & cabling teams with in-house HDD machinery and whole complement of equipments to undertake fibre infrastructure work.



## OUR SERVICES

**GRUPPE CONSULTANT**, or GRUPPE for short, is an engineering firm that specializes in providing structural and technical A&E services to the Telecommunications Industry. With a dedicated staff comprised of decades worth of experience, we bring innovative and efficient solutions to our clients daily and become integrated with your team. Our goal is to fully support your operations with extensive knowledge of the subject matter to prevent permitting and construction delays.

### 01 STRUCTURAL ANALYSIS

Rooftops  
Towers  
Antenna Mounts  
Water Tanks

### 02 CONSTRUCTION DRAWING

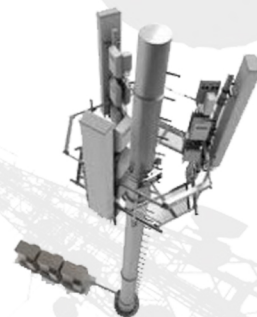
Macro  
Small Cell  
Fiber

### 03 TOWER CLIMBING

Tower Mapping  
Mount Mapping  
Equipment Audits

### TOWER

GRUPPE is capable of handling all of your structural needs for a telecommunication tower. Whether your tower is a monopole, self-support, guyed tower, water tank or another unique structure GRUPPE is here to help. Our staff of experienced engineers can design or analyze an existing tower and its foundation in accordance with the applicable TIA/EIA standard. If a tower or foundation does not meet this standard our staff can quickly design modifications which can be installed to strengthen the structure. A structural opinion letter may be provided when there is a minor change in antenna loading to a recently run structural analysis.



### MOUNTS

Today's evolving industry requires a wide array of equipment to be placed on a telecommunication tower. In some cases the move to LTE has also led to an increase in antenna size and an increase in antenna quantity. This additional loading is now placing more stress on equipment mounts than ever before GRUPPE is capable of analyzing new or existing mounts to ensure the safety of a proposed installation for the customer, tower owner and future tower climbers. Our engineers will analyze the mount along with the existing or proposed equipment loading. If the proposed or existing loading is found to be acceptable, we will produce a stamped report which can be submitted to the local jurisdiction.



### ROOFTOP

Carriers are now deploying antennas in more locations as the customer's demand for data increases. Rooftop collocation is becoming a very attractive alternative to traditional tower collocation due to the need for real estate in high traffic areas. GRUPPE's experience in building design along with our knowledge of telecommunications equipment and antenna mounting procedures, makes us a perfect partner for your rooftop installation. As times change and rooftop installations become larger, heavier, and more critical to the network, rely on our experience to help keep carriers and landlords at ease. Our years of experience allow us the ability to analyze a proposed or existing rooftop installation in a number of ways in an expedient and cost-effective manner.

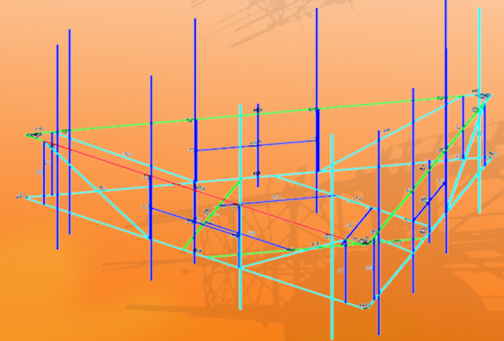
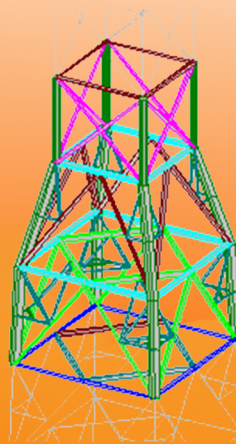
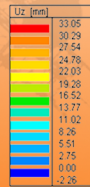
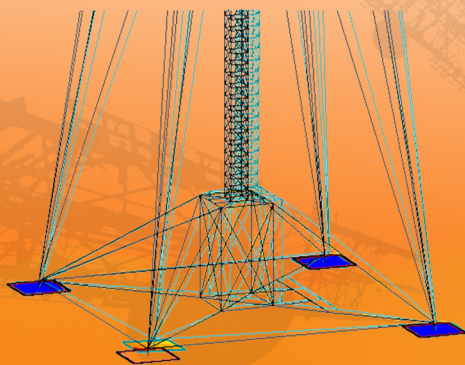


# ADVANCED ANALYSIS FEATURES

Utilizing our industry-leading software programs, we are able to accurately and efficiently perform in-house structural analyses and foundation designs. Each of products comes with complete assembly drawings to ensure easy, accurate and efficient installation.

FEA Finite Elements Analysis  
Static Analysis  
Linear and Nonlinear Analysis  
P-Delta Analysis  
Natural Frequency Analysis  
Static Equivalent  
Seismic and Dynamic Analysis  
Time-History Analysis  
Modal Analysis  
Spatial Objects and Spatial Loads

Buckling Analysis  
Spectral Analysis  
Advanced Section Stress  
Torsion and Warping  
Built Up Sections  
Catenary Cables  
Diaphragm Analysis  
Notional Horizontal Loads  
Loads and Load Combinations  
Direct Analysis Method (DAM)



When it comes to telecommunications engineering, **GRUPPE CONSULTANT** does it all. As a full-service engineering and construction organization, we operate in a variety of capacities for both new and existing construction projects. Our services range from initial site design through construction to the final inspection.



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## CONTACT



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