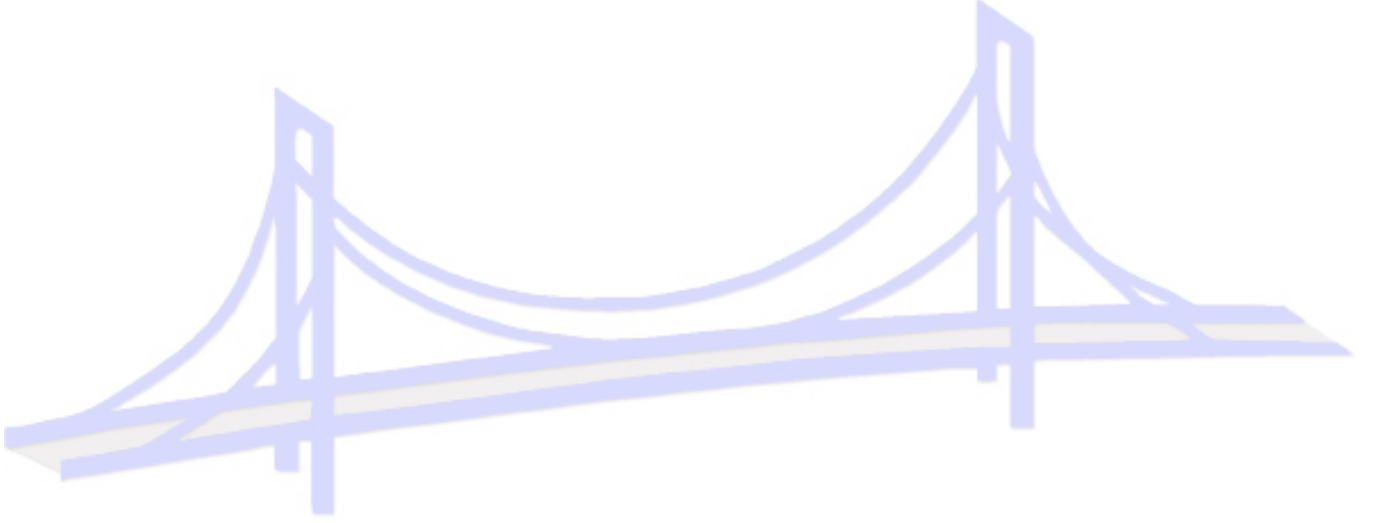




MARMARA GROUP
Dış Tic.Ltd.Şti. - Turkey



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Highway (2 - 11)



- Highway Guardrails
- Steel Wire Guardrails
- Pedestrian Guardrails
- Energy Absorbing Guardrails
- Noise Barriers
- Traffic Safety Materials and Speed Bumps
- Steel Pedestrian Overpasses
- Traffic Signboard and Omega Poles
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Poles (12 - 19)



- Steel Construction Towers
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- Polygonal Poles
 - Street Lighting Poles
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Galvanizing (20-21)



- Hot Dip Galvanizing
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Highway Guardrails

Guardrail is a passive protective system that holds the vehicles within the highway. Guardrails are installed to prevent vehicles from running off the road and crashing into things alongside the road for any reason, and thus to protect people and other things that are located by the road.

Guardrails also help minimizing the fatality, injury and material damage caused by accidents due to misuse of vehicles. Also, before installing the guardrails, it may be wise to check whether is it possible or not to make any structural changes in order to prevent potential dangers.

Guardrail Application Types

Today, there are lots of guardrails that are made of numerous material, with different types and height.

We can analyze guardrails in three groups according to their deformation characteristics.

- I. Flexible systems
- II. Half rigid systems
- III. Rigid systems

Guardrails are split into three according to material type and expected protection impact.

- I. Steel guardrails
- II. Concrete guardrails
- III. Steel roped guardrails

Guardrails are split into two according to their behaviors after crash

- I. Elastic and plastic behavior guardrails (e.g. Steel Guardrails)
- II. Rigid systems (e.g. Concrete Guardrails)



Steel Wire Guardrails

Steel wire guardrails are mostly preferred because of its flexibility for more efficient results and aesthetic appearance for city aesthetic. MARMARA GROUP enhanced steel wire guardrail production along with increasing demands from Turkey and all over the world.



Pedestrian Guardrails

Pedestrian guardrails which are produced by stainless steel have various heights and types and are either galvanized or painted at will of our customers. They are designed specifically according to area of use produced and installed.





Energy Absorbing Guardrails

These are energy absorbing guardrail systems that ensure high level driving safety by minimizing damage to be incurred through absorption of collision strength during accidents that be happened.



Noise Barriers

Noise barrier is an exterior structure designed to protect inhabitants of a settlement from noise pollution. Noise barriers are the most effective method of mitigating roadway, railway, and industrial noise sources – other than cessation of the source activity or use of source controls.



Traffic equipments are products manufactured and used for organizing our life, regulating our environment and preventing various accident hazards. They are the chief actors of traffic regulations. Materials like buttons with lights, speed reducers, traffic cones, warning barriers, signboards and traffic posts are used for safe and smooth traffic as well as safety of the pedestrians.



Speed Bumps

Speed bumps are the common name for a family traffic calming devices that use vertical deflection to slow motor-vehicle

traffic in order to improve safety conditions. Speed bumps of various sizes can be placed on a road, with two four-foot or six-foot devices on it with a space on either side.



Steel Pedestrian Overpasses

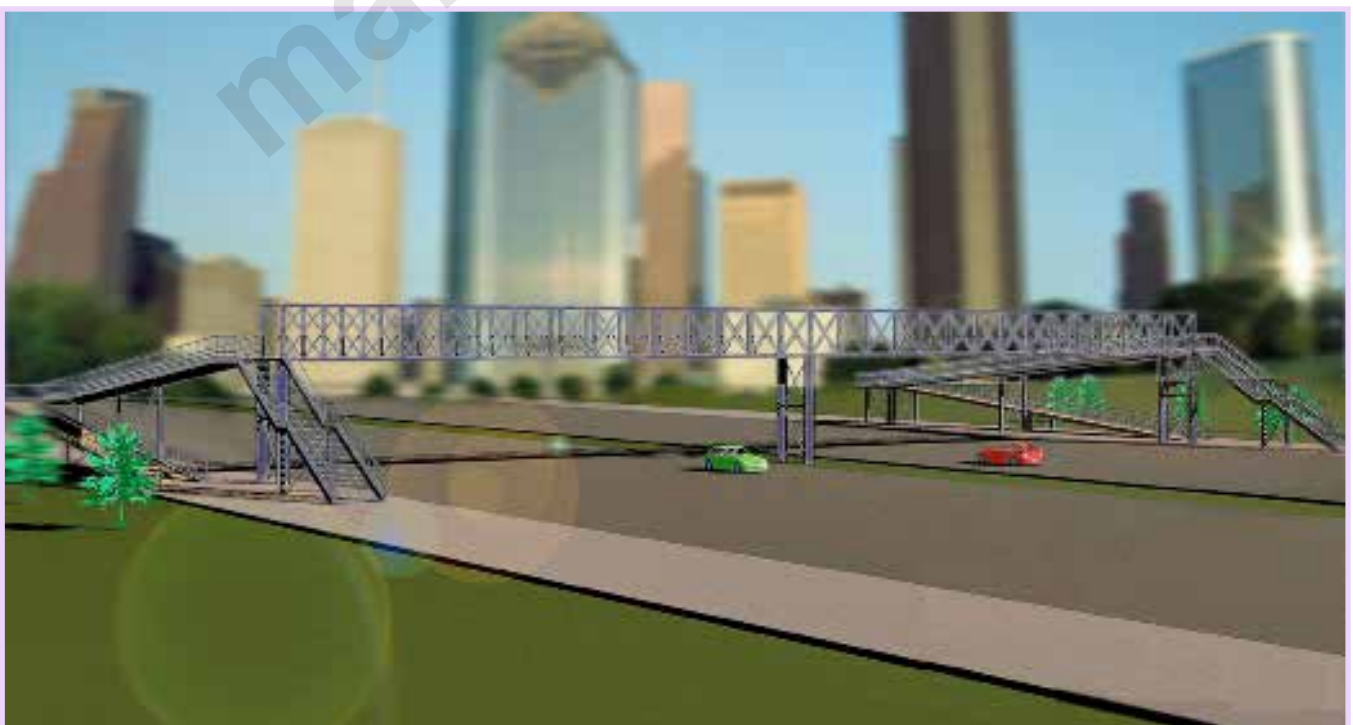
The need for crosswalks has risen in recent years, as the number of highways which are renewed every day and the number of vehicles entering into service has also increased and particularly intercity highways were left in the middle of central places. While crossing the street, hundreds of people lose their lives each year particularly in metropolitans. The best alternative aimed at solving this problem is to increase the



number of crosswalks. The crossroads can be generally divided into two categories, namely, underpasses and overpasses.

The observations which have been carried out reveal that pedestrian overpasses are healthier, cleaner, more problem-free and safer than underpasses. Considering the general situation in our country, it can be seen that the steel and

concrete are on the foreground in the construction of pedestrian overpasses. The steel construction building enjoys more advantages than concrete buildings.



Why Steel Should be used in Pedestrian Overpasses?

- 1- The steel is a material with higher resistance than wood and concrete.
- 2- The steel is earthquake-resistant, because its elasticity module is 21 folds of wood and 10 folds of concrete. This situation means a more suitable attitude towards stability problems, dynamic loads and vibrations.
- 3- Much wider clearings can be passed with smaller cross-sections.
- 4- The steel structure can be designed by maintaining endurance and aesthetics in desired forms, depending on architectural characteristics.
- 5- As most of the manufacturing stage is handled in workshops, the working time in construction site gets shorter and thus the energy- and time-saving can be ensured.
- 6- The steel structure elements can be modified and reinforced. Furthermore, they can be dismantled and reused.
- 7- The steel has higher amortization and second-hand value.
- 8- Its useful life is 80-100 years.
- 9- It's easier to maintain it.





In general, the height of the poles manufactured as 3, 4 or 5 mm in thickness are set according to length of the plate to be mounted. The special structure of the poles fixes the plates and prevents them from rotating around their own axis.

Its life span is further extended using hot-dip galvanized coating. Furthermore, no maintenance is required for the poles thanks to the hot dipping method. Using readily available holes in the poles, the adjustments can be made as requested and plates can easily be mounted on the poles.

Omega poles are used to mount signboards outside the paving of the highway, such as standard traffic signs, info boards smaller than 1 square meter, village name plates. These poles, which are easy to manufacture with high durability are renamed after the Greek letter "omega" as its cross section looks like it.

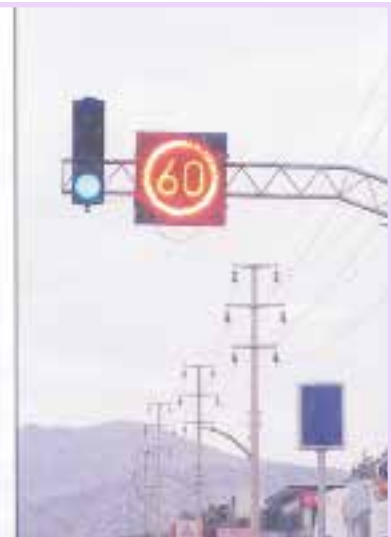




Signalization Pole

It is one of the modern and technological systems used in highways for security of life and property.

Cars and pedestrians are in safe with these directions in cities and on expressways. As, Marmara Group, we can manufacture traffic signalization poles in every height and width.





Road Marking Machines

Our road marking products consist of not only lines, but also various signs applied on the road surface. These markings guide drivers through traffic safety instructions and restrictions. They are produced by thermoplastic or cold paint.

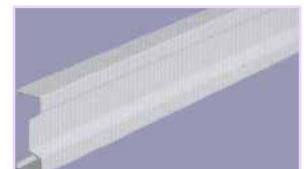




Sigma Pillars of different lengths are 1.000mm to 4.000mm and in different thickness from 2,5mm to 5mm in order to use in various projects by private enterprises.

Pillars are produced with bores in various numbers or diameter. Galvanization of the pillars is also made by our qualified personnel.

In such a globalizing world, we are proud to be the solution partners of our distinguished customers in every aspect that is readily available or can be developed within our processing capabilities





Steel Construction Towers

Steel Construction Towers are used in many areas as shown on the table below. They bring life into many objects that we use and fill an important gap in our daily lives: all the electrical devices at our homes and offices, cell phones that we use to communicate with each other, TV broadcasts, indispensable parts of our lives and radio broadcasts that reach us anywhere we are.

Lattice Towers

- Power Transmission
- Antenna (UHF-VHF-FM)
- GSM
- Transformation Center

Monopole Towers

- Antenna (FM)
- GSM
- Lighting



Before application of our projects, they are drawn on computer workspace as models and documents that contain every detail of work till to the completion of it are prepared.

These documents contain every material that are going to be used, equipment specifications, application processes, material quality informations and technical specifications.





Power Transmission Poles

Our power transmission line poles used in transmission and distribution as overhead lines are manufactured in compliance with TEDAŞ and TEİAŞ specifications and TIA/EIA – 222F standards.

Power transmission line poles are manufactured in four categories: low, medium, high and ultra high voltage, as per demand, and are designed in compliance with national and international standards.



We also produce transformer stations, switchyards, steel constructions and telecommunication towers in accordance with power transmission line projects. We provide power transmission poles in the following categories according to its voltage:

- Medium Voltage Poles between the range of 1 – 35 kV
- High Voltage Poles between the range of 35 – 154 kV
- Ultra High Voltage Poles over 154 kV



Transformation and Switching Centers

Transformation centers are systems consisting of many steel constructions (electricity lines, transformation devices, etc.) Purpose of the transformation centers is to render the electricity generated at the power station suitable for use in a region, city, town or industrial area, etc.





Antenna Towers (UHF-VHF-FM)

Antenna towers are the poles used in terrestrial TV and radio broadcasting. Even if antenna poles structurally look like power transmission poles, in fact they are very different. The most prominent feature of this type of towers is wind speeds and deciding the right building spot. The design of these types of poles is determined by geographical conditions of its region and the type of usage. Galvanized and bolted design are made in our production plant by our specialized project, design and manufacturing staff.

GSM Towers

GSM Towers are very similar to antenna towers. They may even look exactly the same as structures, but the usage of these poles determine their

differences. This type of poles are manufactured as galvanized and bolted lattice braid, and can also be designed and manufactured in the form of monopole towers. Also these types of towers, up to 10 to 100 meters are completely made in our production plant by our specialized project, design and manufacturing staff.





Polygonal Poles, which are designed and manufactured as galvanized according to the TS-ISO 9001, with minimum S235JR (EN10025) material and minimum 5.8 (ISO898) bolt quality, are as follows:

Street Lighting Poles

Designed and manufactured for lighting of avenues, streets, parks and refuges in special projects, 3 to 15 meters in height, in compliance with TEDAŞ and EIA/TIA-222F standards. These poles are delivered in one piece up to 12 meters, and with 1-2-3-4 cantilevers and anchored.

Projector Poles

Designed and manufactured for lighting of squares, boulevards, parks, storage areas and stadiums in special projects, 5 to 60 meters in height in compliance with TEDAŞ and EIA/TIA-222F standards. These poles can be produced with a platform, a portable or protection ladder, or a lift mechanism, 1-2 or 4 directional or circular.





Camera Poles

Designed and manufactured with the method of stringent polygonal modules or as monopole, with flange connection, galvanized, without ladder or with portable/protected ladder options in 3 to 25 meters in height.



Flag Poles

Designed and manufactured with the method of stringent polygonal modules, 5 to 100 meters in height, as polygonal cone, circular cone and infinite rotary with internal rope, with standard external rope and infinite rotary polygonal elevator.



Billboard and Commercial Display Poles

Designed and manufactured as galvanized/painted without ladder or with internal ladder in totem shape with the method

of stringent polygonal modules or using steel pipes, 5 to 40 meters in height.





Solar Lighting Poles

In daytime electricity store into batteries from sun by panels and then in night time that stored electricity light special lamps.





Wind Poles

Wind Poles, which is used in energy generation with wind, will be more important in coming years than today. Marmara Group an being environment-conscious firm

and investment to future, manufacture for all over the world.



Grounding Equipment

The purpose of grounding is to transmit electric flow to the ground as quick as possible. If this is failed to do, reflow of the electric discharge can be very hazardous for human life and can make serious damage on property. Therefore, all the poles and steel constructions should be grounded to avoid thunderbolts and leakages.

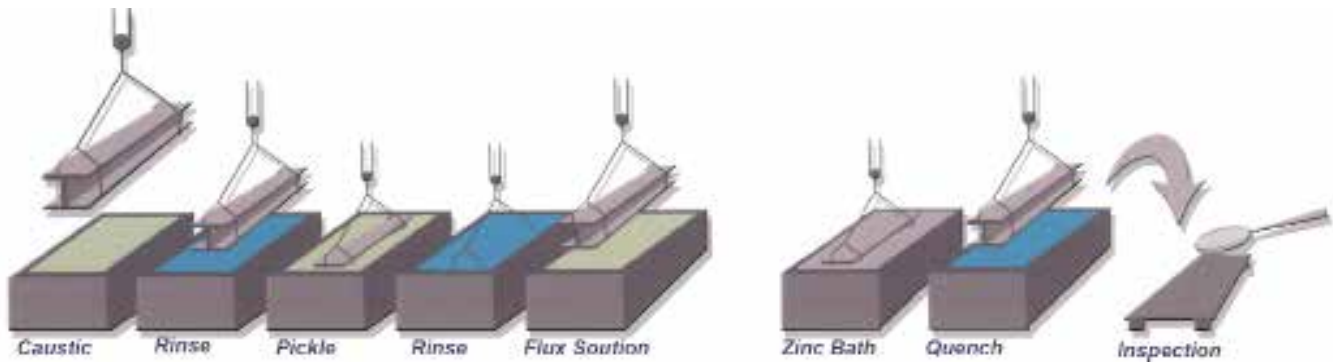
Grounding Strip

Our company manufactures grounding strips in compliance with TS 914 EN ISO 1461 and TS EN 62305-3 standards. By means of zinc-iron alloy formed over the surface of the strips coated by hot-dipping galvanization technique, protection against corrosion is obtained. As the rate of abrasion of the zinc is slow, this expands the life span of the coating and ensures that the protection lasts for ages by forming a cathodic protection layer on damaged sections. Thickness of the galvanized coating should be at least 70 microns. Although it differs according to various conditions, approximate life span of the strips manufactured by using hot-dip galvanized coating can be 20 to 60 years without requiring any maintenance.

Grounding Electrode

Our company manufactures electrodes that ensure contact between the ground and the facility. The grounding electrodes are processed with hot-dip galvanization coating, and their service life is further extended.





Hot Dip Galvanizing

The purpose of hot-dipping galvanization coating process is to have a protection layer against abrasion and corrosion of iron and steel.

If necessary measures are not taken, iron and steel products corrode and thus they become unable to function. With a view to keep the metal out of the external factors that lead to corrosion, preventive methods are applied over the surfaces.

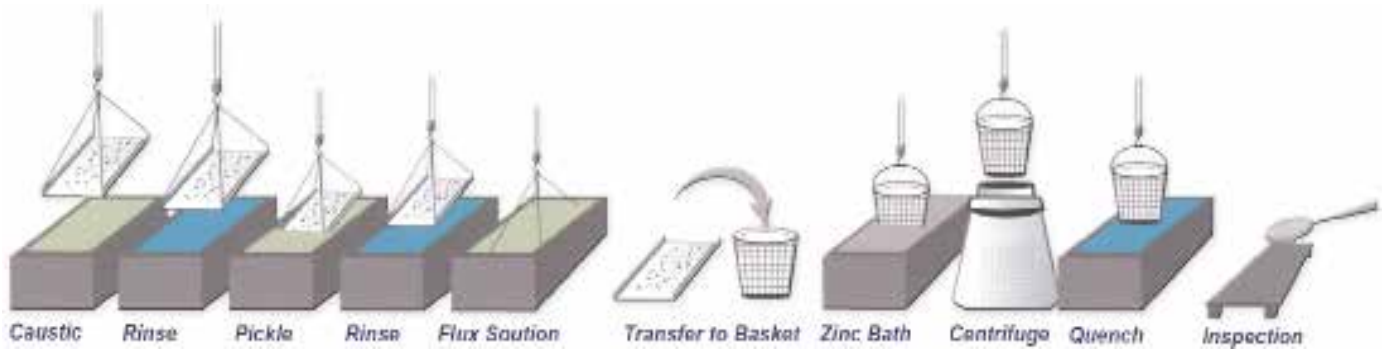
But the biological and chemical-based coating ensure only a temporary and ineffective solution, while galvanized coating (zinc plating) ensures long-standing protection in preventing corrosion. Hot-dipping galvanization is a coating method used for about 200 years all over the world for protecting iron and steel against corrosion.

Products coated with galvanization have different life spans according to the environmental conditions, but the average life span of these products is about 20 to 40 years without requiring any maintenance.

Advantages of Hot-Dipping Galvanization Process

- Low cost
- Self-repairing
- No maintenance needed
- Resistant against scratches
- Diffusing into hard to reach surfaces (sharp corners, hollows, hole surfaces etc.)





Centrifugal Galvanizing

We also offer centrifugal coating applied for the galvanization of bolts, nuts, flakes, washer, anchoring, studs, U-bolts, pipe clamps, chemical dowels, lifting load rings, space frame bolt products to our customers since 2007. In the centrifugal galvanized process, there is a process of rotating small scale parts coated by galvanization in the centrifugal equipment as different from hot-dipping galvanization process.

Products that are processed with Centrifugal Galvanization

- Bolt
- Nut, flake, washer
- Anchoring
- Stud
- U-bolt
- Pipe clamp
- Chemical dowels
- Lifting load rings
- Space frame bolts
- Various casting elements coating





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