

LIGHT STEEL
CONSTRUCTION
& TRADING



DESIGN. CREATE. BUILD.

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NORMATIVE REFERENCES

The following normative documents contain provisions which, through reference in this text, constitute provisions of the European Standard. For dated references, subsequent amendments or revisions of any of these publications do not apply. However, parties to agreements based on this European Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies.

EN 1993 Eurocode 3 – Design of steel structures

Part 1-1 to part 1-12

EN 10002 Metallic materials - Tensile testing:

Part 1: Method of test (at ambient temperature);

EN 10025-1 Hot-rolled products of structural steels - Part 1: General delivery conditions;

EN 10025-2 Hot-rolled products of structural steels - Part 2: Technical delivery conditions for non-alloy structural steels;

EN 10025-3 Hot-rolled products of structural steels - Part 3: Technical delivery conditions for normalized / normalized rolled weldable fine grain structural steels;

EN 10025-4 Hot-rolled products of structural steels - Part 4: Technical delivery conditions for thermomechanical rolled weldable fine grain structural steels;

EN 10025-5 Hot-rolled products of structural steels - Part 5: Technical delivery conditions for structural steels with improved atmospheric corrosion resistance;

EN 10143 Continuously hot-dip metal coated steel sheet and strip - Tolerances on dimensions and shape;

EN 10149 Hot rolled flat products made of high yield strength steels for cold-forming:

Part 2: Delivery conditions for normalized/normalized rolled steels;

Part 3: Delivery conditions for thermomechanical rolled steels;

EN 10204 Metallic products. Types of inspection documents (includes amendment A 1:1995);

EN 10268 Cold-rolled flat products made of high yield strength micro-alloyed steels for cold forming - General delivery conditions;

EN 1993-1-3: 2006 (E) 6

EN 10292 Continuously hot-dip coated strip and sheet of steels with higher yield strength for cold forming - Technical delivery conditions;

EN 10326 Continuously hot-dip coated strip and sheet of structural steels - Technical delivery conditions;

EN 10327 Continuously hot-dip coated strip and sheet of low carbon steels for cold forming - Technical delivery conditions;

EN-ISO 12944-2 Paints and varnishes. Corrosion protection of steel structures by protective paint systems.

Part 2: Classification of environments (ISO 12944-2:1998);

EN 1090-2 Execution of steel structures and aluminium structures

Part 2: Technical requirements for steel structures:

EN 1994 Eurocode 4: Design of composite steel and concrete structures;

EN ISO 1478 Tapping screws thread;

EN ISO 1479 Hexagon head tapping screws;

EN ISO 2702 Heat-treated steel tapping screws - Mechanical properties;

EN ISO 7049 Cross recessed pan head tapping screws;

EN ISO 10684 Fasteners – hot deep galvanized coatings

ISO 4997 Cold reduced steel sheet of structural quality;

EN 508-1 Roofing products from metal sheet - Specification for self-supporting products of steel, aluminium or stainless steel sheet - Part 1: Steel;

FEM 10.2.02 Federation Europeenne de la manutention, Secion X, Equipment et procedes de stockage,

FEM 10.2.02, The design of static steel pallet racking, Racking design code, April 2001 Version 1.02.



LIGHT STEEL
 CONSTRUCTION
 & TRADING

LEADER IN NEW
CONSTRUCTION
TECHNOLOGIES

Our company offers versatile solutions, which fits any need, from a classic house to the most modern and sophisticated architectural design and engineering.

We serve both private and public institutions to project and build Social houses, Luxury condos, Industrial buildings, Warehouses, Multi storey buildings and institutions such as hospitals, banks, schools, universities and hotels.

We design and build using the Light Steel Frame system.

The long worldwide experience of the Group enables Light Steel Construction Qatar to perform a leading activity along the GCC countries.

Design
 Produce
 Build
Light Steel Frame



CONSTRUCTION SYSTEM



Location: Portugal - Turn-key project

Construction period: 3 months



Light steel frame

Light steel frame buildings are structural wall frames and roof trusses, manufactured from cold formed Light gauge galvanized steel sections. Exterior cladding consist of a single skin brick wall or fiber cement boards, fixed to the wall frames which can be cladded with anything from slate to sandstone, from marble to tiles.

The cladded wall can also be filled with a concrete mix which we call the "Solid Wall" Services – electricity and plumbing – are installed in the wall cavity created by light steel frames, as it happens with the insulation material. Gypsum board fixed to the light steel frame, is typically used for internal wall cladding and ceilings.

Steel mills produce galvanized sheet steel, the basis material. For light-gauge steel, Light Steel Qatar takes the sheets of steel into the final profiles used for framing. These sheets are zinc coated (galvanized) to prevent oxidation and corrosion. Steel framing provides excellent design flexibility due to the inherent strength of steel, which allows it to span over a longer span than wood and also resist wind and earthquake loads. Steel framing is inherently less energy efficient than wood as it is a conductor. Construction with steel framing contributes to less thermal bridges between the outside environment and the interior conditioned space.

The engineering and design of light steel trusses is not something which any engineer can do and should be left for trained professionals. Light Steel Qatar has state-of-the-art design, engineering and production techniques which ensure that your property is secure and efficient. Our team of experts is composed of structural engineers, designers and quality technicians. We supervise all the production work and assemble all the structures to make sure that the whole process is well integrated. Finally, we assure that steel structures and frames reach the desired destination in time.

TYPES OF BUILDING

- Luxury houses
- Condos
- Multi storey buildings
- Penthouses
- Expansions (vertical / horizontal)
- Pavilions
- Factories
- Warehouses
- Malls
- Logistics centers
- Clinics
- Bank agencies
- Stores
- Kiosks
- Hotels
- Schools
- Universities
- Offices
- Data centers
- Partition walls
- Ceilings
- Coverages
- Mezzanines
- Slabs

WHY LIGHT STEEL CONSTRUCTION?



- Faster construction
- Structural Safety
- Unlimited design
- High standard finishing details
- Great thermal and acoustic insulation
- Greater durability
- Spans up to 32m
- Building dry and clean
- Greater comfort
- Higher quality coating materials
- Cost control
- Skilled labor
- Series production
- Low cost maintenance
- Easy to assemble
- Does not oxidize
- Does not deform
- 100% recyclable

FIRE RESISTANCE

Steel Framed Residential Homes would never burn or turn the expansion of fire possible. Family and loved ones get enough time to escape from this natural disaster and to save remaining structure.

TERMITE RESISTANCE

Steel is an impervious material which termites and wood insets cannot eat or chew. Structural damages can be avoided by using steel structures.

Steel Lattice Towers



The company Light Steel Qatar offers comprehensive solutions for steel lattice towers.

The mesh can be easily transformed, thanks to its easy handling and can still be used for energy (high, medium and low voltage), telecommunications, lighting, photovoltaics and others.

Our factory is capable of producing a large amount of steel lattice towers and assemble them in very quick and easily spot.

Combining production and a highly experienced team, Light Steel Qatar offers lattice towers for any part of the world. We manufacture high voltage transmission towers with any type of fabric, from steel lattice towers for self-support and 220kV to 765kV transmission lines in.

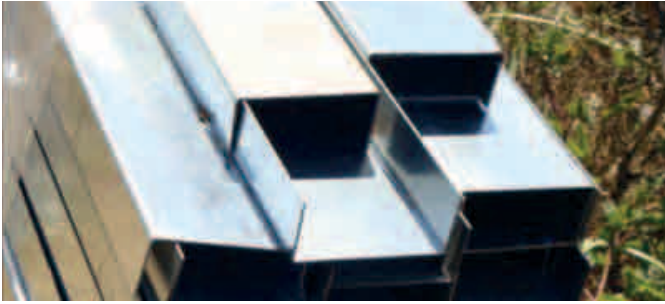
Advantages

- Fast production
- Competitive price
- On-site assembly
- Ecology



GALVANISED LIGHT STEEL PROFILES

OSB (ORIENTED STRAND BOARD)



STEEL

Physical and Mechanical Structural Parts

The elements of cold-formed from galvanized steel sheet have physical and mechanical characteristics that meet the standards specified in the following:

- ASTM A653 Type 33, 37, 40 and 50 (Class 1 and 3)
- ASTM A792 Type 33, 37, 40 and 50A
- ASTM A875 Type 33, 37, 40 and 50 (Class 1 and 3)

GALVANIZATION

The steel sheet used in construction by Light Steel Qatar-GSJ is protected against corrosion through the process of immersion in hot bath (hot galvanizing) of zinc or zinc-aluminum. According to the standards referred to 'Prescriptive Method for Residential Cold-Formed Steel Framing', the steel used in the structure must have a galvanizing Z180 in normal use and Z275 in adverse conditions such as in coastal areas. However, our regular standard is Z275.

CASTING

The galvanized steel sheet used in construction is molded in sections C and U by bending or profiling. These processes ensure parts perfect angles and dimensions suitable for a technically advanced construction. Profiles and beams are manufactured with the holes regularly spaced so as to allow the passage of pipe or tubing.

THICKNESS

The thickness varies depending on the purpose of parts. Generally, we use thicknesses from 1.0 mm in bearing walls up to 2.5 mm in the floor joists.

DIMENSIONS STANDARD

- Length - 2600 mm
- Width - 1200 mm
- Thickness - Of the plates used in the coating of walls and roofs have a thickness of 11 mm. Boards with 18 mm thickness are applied on floors. However, depending on the application requirements, plates may be used whose thicknesses vary from 6 mm to 22 mm.

DENSITY

Average weight 640 kg per cubic meter

THERMAL RESISTANCE

The thermal resistance coefficient of a material is the measurement of the resistance offered to the passage of heat being influenced by the density and thickness of the material. In 11 mm thick plates this is $R = 0.071 \text{ m}^2 \text{ }^\circ\text{C} / \text{W}$

FLAME SURFACE SCATTERING

The plates are considered difficult to combustion, serving as a barrier to fire for 30 minutes

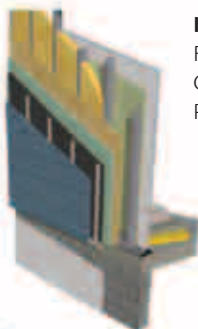
EXPANSION JOINTS

Foreseeing possible movements adjacent plates should be applied with a 2 mm gap between them.

CONSTRUCTIVE DETAIL WALL - External and Interior

EXTERNAL

- LSF profile
- OSB
- Waterproofing membrane
- Adhesive
- Insulation board
- Reinforcement mesh
- Base coat
- Finishing coat



INTERIOR

- Rock Wool
- Gypsum board
- Painting



Rock Wool

CHARACTERISTICS

This material consists of mineral fibers of volcanic rock, impregnated and bonded by resins, presented in the form of plate or blanket, set the spacing between beams or metal profiles with resistance properties to the action of fire and with insulating properties that ensures excellent levels comfort that are completely impossible to achieve in traditional buildings.

ADVANTAGES: excellent levels of thermal and acoustic insulation, does not provoke allergies does not absorb water, does not rot, it allows the passage of air and is of unlimited durability.

EXTERIOR FINISHES



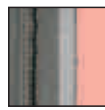
As a versatile technology, this construction allows the use of any kind of coating on the outer walls, according to the tastes and preferences of the owner. Examples of exterior coatings that can be used are: traditional cement render, plaster designed brick ass, mosaic, tile, and all kinds of stones (granite, limestone, etc...), Cement board, board VIROC, ventilated facades, among other.

To ensure sealing of the cover, it is usual to apply materials such as screens or sub tile. Typically, these materials are used in conjunction with thermal insulation, such as boards EPS adequate coverage. The roof can be finished with ceramic tile, corrugated or profiled sheet, sandwich panel, among others.

For doors and windows are usually chosen frames good thermal behavior, such as PVC, aluminum with thermal systems or dual aluminum frames, stainless steel, PVC, and wood.

Examples of exterior finishes:

- Stones
- Plastering heat from the outside (ETICS)
- Magnesium Board (MgO)
- Brick
- Mosaic / ceramic / tile
- Cement boards
- Wood
- Viroc
- EPS
- Alucobond
- Traditional ceramic tile
- Sandwich panel
- Aluminum thermal cutting of double installation systems



ETICS



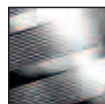
OSB



EPS



Sandwich Panel



Steel



Stone



Wood



Mosaic



Magnesium Board



Viroc

INTERIOR FINISHES



The structure of the walls and ceilings of a building with LSF structure is generally coated with plasterboard walls that after the treatment of joints, may be painted or coated with other materials, such as tile or wallpaper. The floor joists are coated with an underlay of OSB which support or base for the materials chosen for the finishing, such as carpet, tile, stone or wood. The form of application of these materials is the same as it usually is done in any other building. The same applies to the application of interior doors, cabinets and other elements of furniture and carpentry. Like all other rooms in the house, the bathroom and kitchen are equipped with crockery and materials chosen by the owner without limitation.

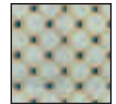
The interior of a house with LSF structure is indistinguishable in appearance from any other room, however has advantages that can not be compared with conventional buildings.

Examples of interior finishes:

- Plasterboard
- Wallpaper
- Painting
- Tile
- Wood
- Carpeting
- Tiles
- Stone
- Marble



Wall Paper



Tiles



Gypsum Board



INFILL PANELS



Built with Infill Panels system

Infill walling is the generic name given to a panel that is built in between the floors of the primary structural frame of a building and provides support for the cladding system. The passed masonry walls are replaced by light steel wall panels. Infill walls are considered to be non-load bearing, but they resist wind loads applied to facades and also support their own weight and the one of the cladding. Light steel walls using C sections are increasingly used as infill walling within both steel and concrete framed buildings, and have largely replaced masonry or timber alternatives.

The same components may be used for internal separating walls, but here the main issues are fire resistance and acoustic insulation rather than resistance to loading. A nominal internal pressure is used in the design of internal separating walls.

In multi-storey framed construction, it is now common practice to use light steel infill walls to create a rapid dry envelope to support the external cladding.

The same form of construction may be used as separating or compartment walls between different parts of the building. The use of light steel infill walls may be applied to steel or concrete framed construction. Light weight, speed and ease of installation are important constructional benefits that have led to the rapid increase in use of this form of construction.

The light steel components used in infill walls consist of C and U sections that are cold roll-formed from galvanized steel strip of 1.2 to 3.2 mm thickness specified to BS EN 10346. The galvanizing (zinc layer) provides excellent durability. The C sections are placed at 400 or 600mm spacing and pairs of C sections may be used next to large openings.

Wall panels can be prefabricated as storey-high units or, more often, are site assembled from C sections that are delivered



Freestanding panel - INFILL PANEL

cut-to-length. The second approach is often the only solution in renovation applications where tolerances in the original construction have to be accommodated.

Infill walls are formed by a bottom 'track' attached to the floor and a top 'track' attached to the underside of the floor above. The top track is a U section and allows the sliding of vertical studs and height adjustment. This movement is essential in concrete frames, where 2 to 3 mm shortening of the concrete structure per floor can occur over time as well as normal structural movements.

Vertical C sections are designed to span 2.4 to 5m between floors, and to resist wind loads or other loads in bending. The horizontal C sections above and below the windows transfer loads back to the vertical C sections.

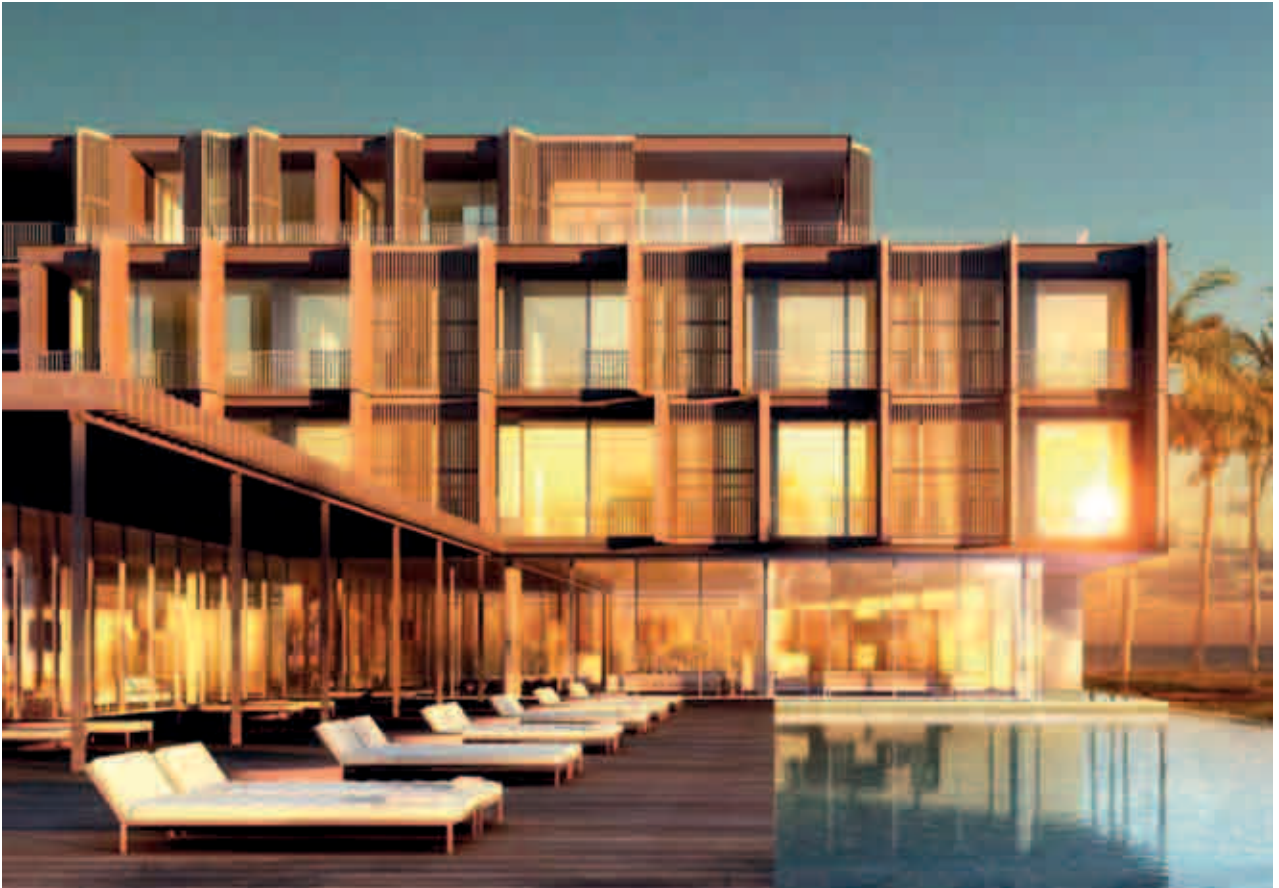
One or two layers of 'fire-resistant' plasterboard (according to BS EN 520[2], Type F) to the internal face provide for up to 90 minutes fire resistance to the light steel infill wall.



Signature of Memorandum Of Understanding (MOU) between GSJ (International umbrella of Light Steel Construction & Trading - Qatar) and the Government of Angola for the construction of 20,000 houses.









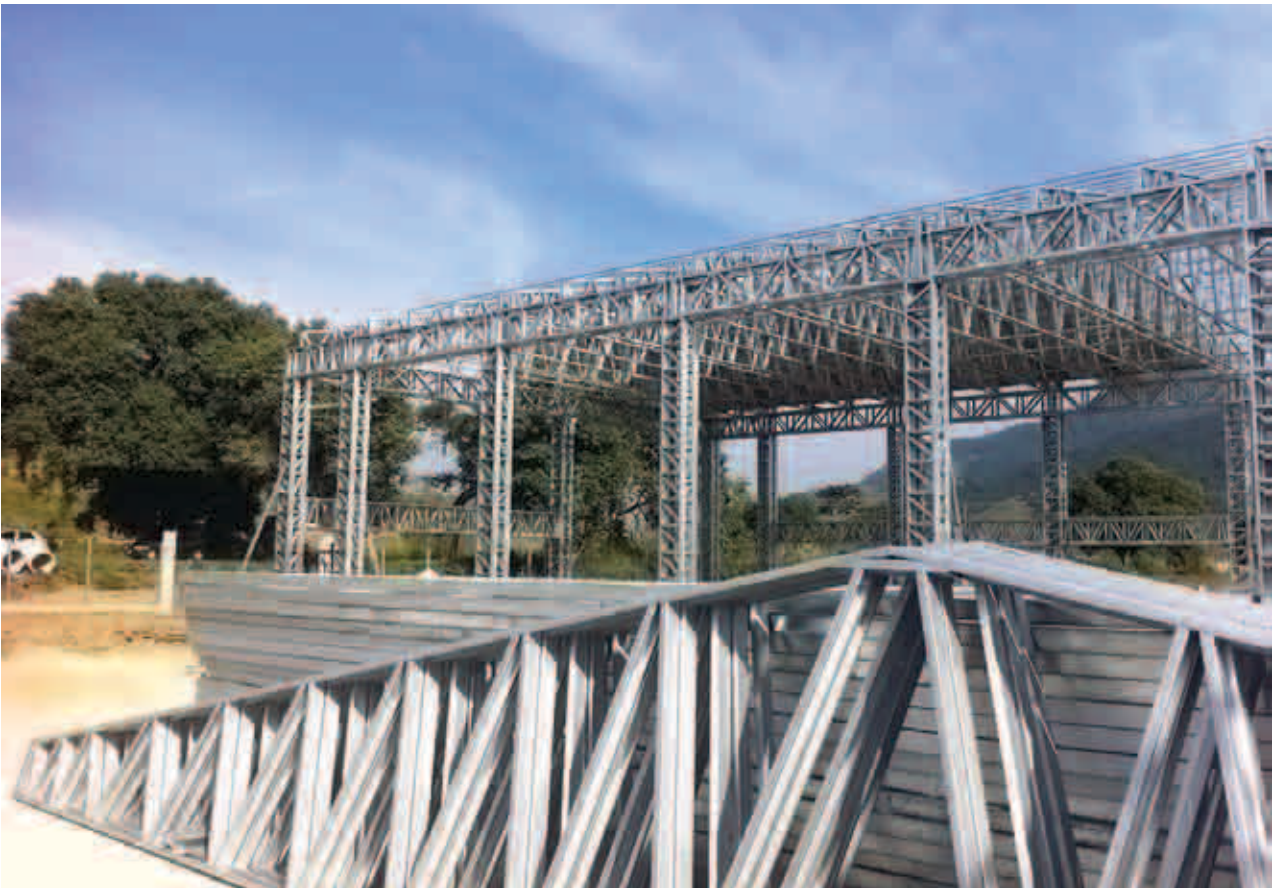




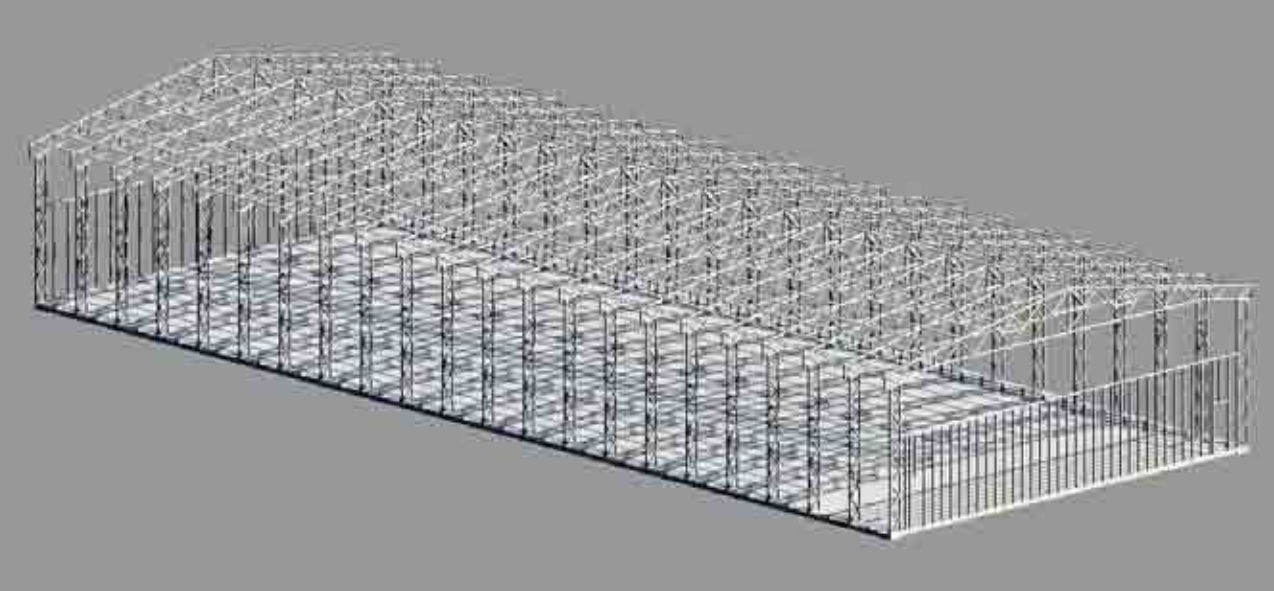




WAREHOUSES











FAST TRACK SCHEDULE BUILDING





EXTERNAL MgO COATING

SOCIAL EQUIPMENTS



University



Sports Academy



Micro Bank Agency



- Roof Cladding** — 40mm sandwich roof panel
- Windows** — Aluminum profiles / 6mm glass
- External walls** — VIROC boards
- Entrance door** — HPL-coated chipboard



Structure
1,370,000m of steel profiles for 500 dwellings

- Stairs** — Metal and woodworks
- Internal walls** — 13 mm plasterboard
- Floor Coverings** — Ceramic Tile
- Sanitary fittings** — Toilet, washbasin and shower trays
- Woodworks** — MDF Interior doors





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