MANDHIR CONSTRUCTION LIMITED

MANDHIR CONSTRUCTION LIMITED
Civil and Building Constructors

THE ROOFING EXPERTS

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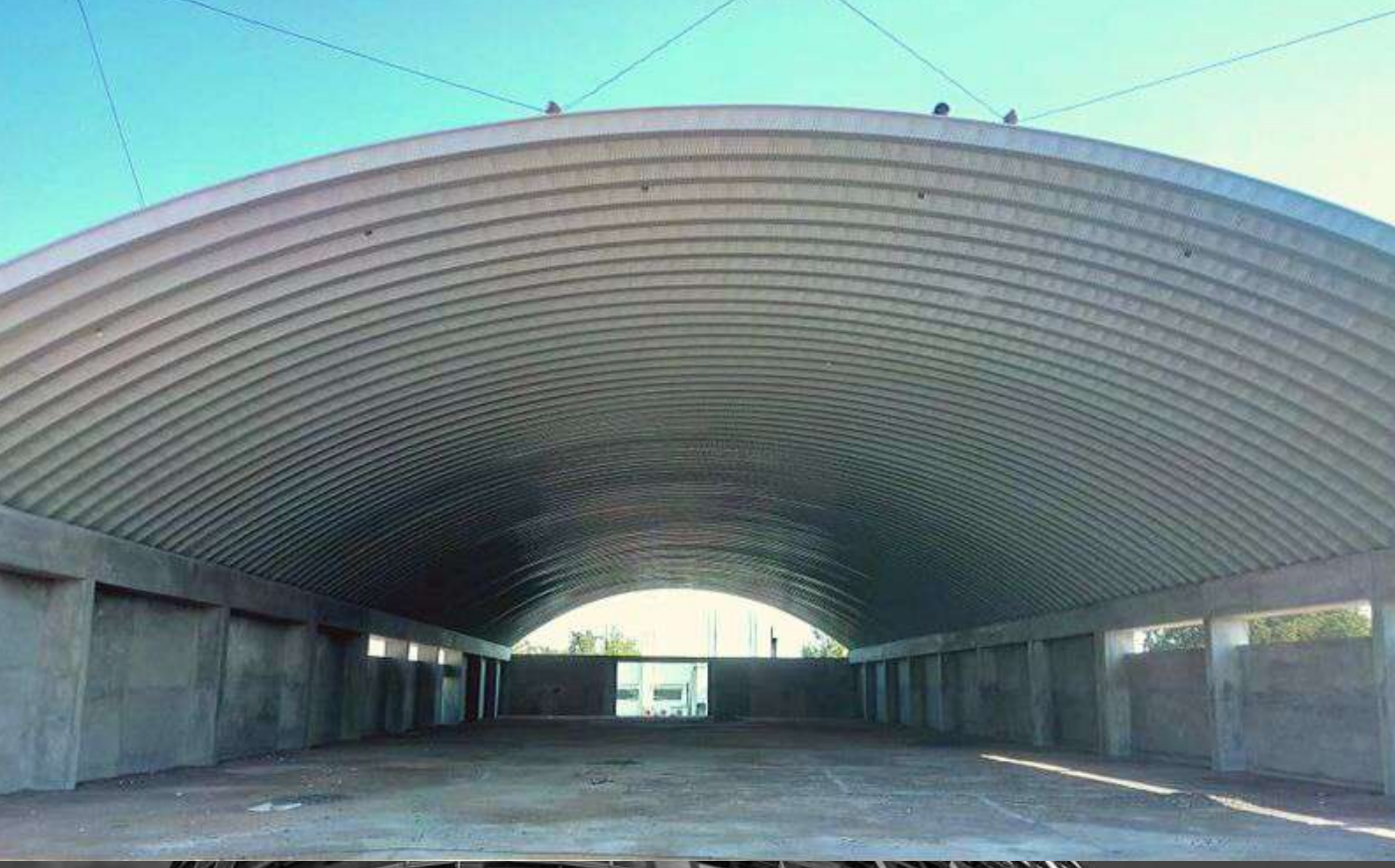


STRUCTURE-LESS ROOFING

The structure-less roofing system is also known as the Arch Roofing System, the Curved Roofing System, the Truss-less Roofing System or the Self Supporting Machine, and is based on the Arch-Principle.

This roofing system is an attractive and unique alternative to a building, industrial shed, etc, and is quickly gaining popularity for it's low cost (50% to 65% savings) and its speedy installation which saves on project time and costs.

Architects usually suggest this type of roofing system because they allow the wide scope of innovative designs & aesthetics.

ADVANTAGES OF STRUCTURE-LESS ROOFING SYSTEMS.

- **This type of roof requires less maintenance and has a long life.**
- **Ensures a quick and easy installation of roofing sheets.**
- **Roofing sheets are mechanically sealed and free from holes, nuts, bolts, overlaps or sealants. Hence no leakage will occur.**
- **Truss-less roof is non-combustible.**
- **It has a higher tensile strength which makes it stronger against accidents like fire and also resistance to extreme weather conditions.**

ADVANTAGES OF STRUCTURE-LESS ROOFING SYSTEMS.

- **Distinguished architectural shape and flexibility of colors result in the strong aesthetic appeal.**
- **The possibility of a bird building their nest is eliminated as there is no truss to support their nest. Thus it helps to provide cleaner and hygienic building environments.**
- **Up to 50% saving in cost as compared to conventional roofing system with truss and sheet.**
- **It facilitates larger enclosed volumes allowing free movement & effective handling of goods and higher flexibility in space utilisation.**

HOW DOES STRUCTURE-LESS ROOFING COMPARE TO TRUSSED ROOFS?

STRUCTURE-LESS ROOFING

Self-supporting structure without trusses, purlins or ancillary support

The elimination/ lack of the need for trusses, purlins or ancillary support lowers the cost of structure-less roofing by between 50% and 60%

Provides clear, unobstructed views and spans.

Installation is fast and easy.

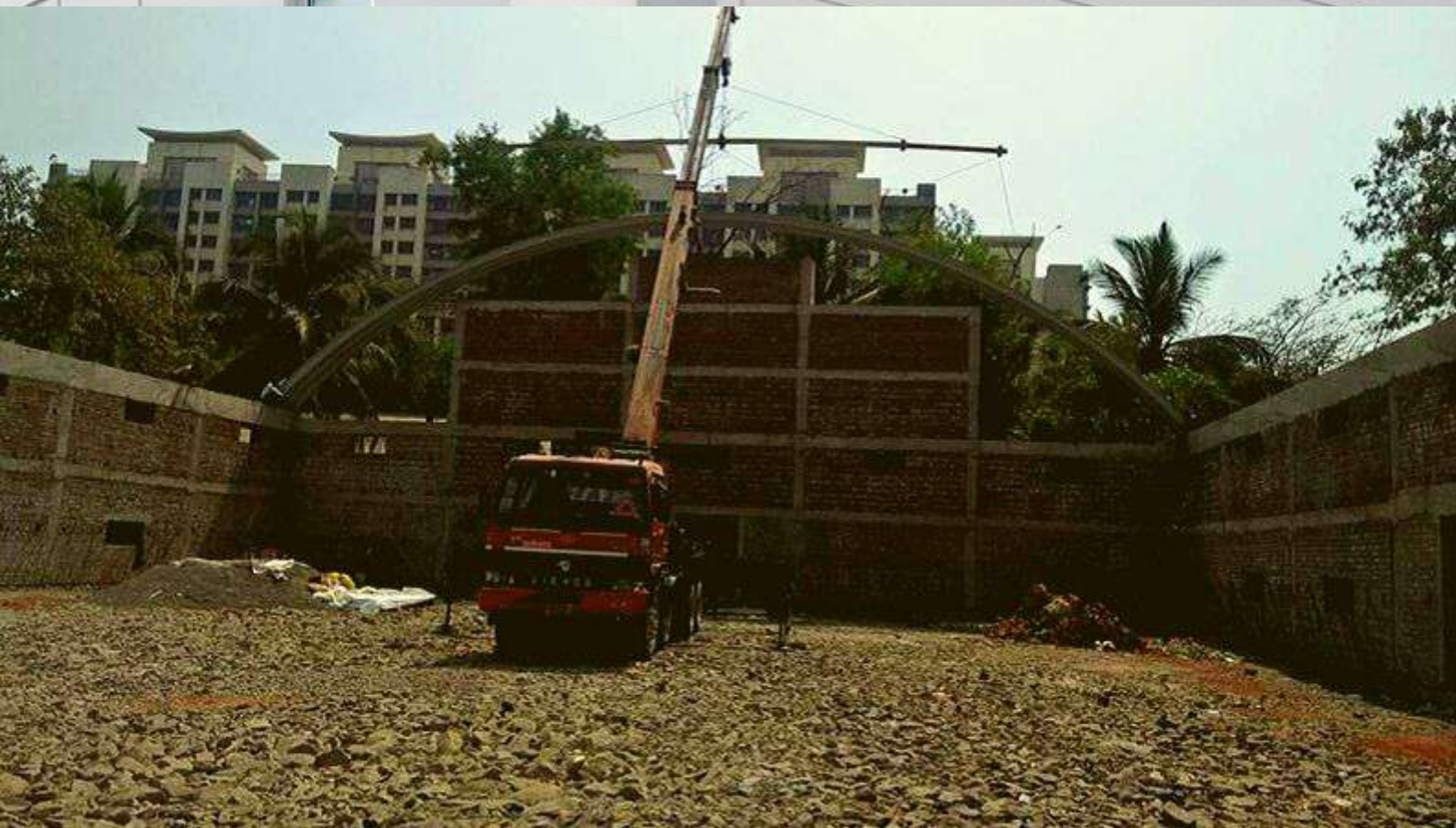
TRUSSED ROOFING

Requires trusses, purlins or ancillary support for it to function and be structurally sound.

The need for trusses, purlins or ancillary support raises the cost of the roof.

The support system for trussed roofs blocks views and at the same time consumes valuable space.

Installation is time consuming and complicated.



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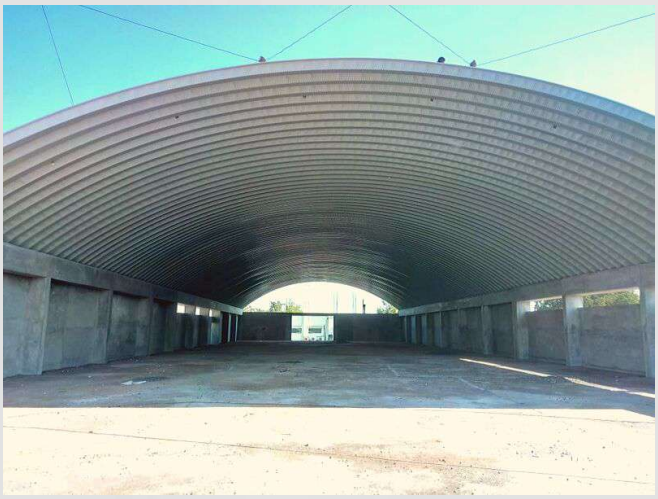
STRUCTURE-LESS ROOFING



Structure-less roofs provide ample space for use within the building.

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The mechanical interlocking mechanism of the roofing sheets ensures that there are no leaks inside the building.

TRUSSED ROOFING

Trussed roofing takes up a lot of space under the roofing sheets to provide for its support. Its shape also limits the full utilization of potentially usable space.

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The presence of many joints between the roofing sheets of trussed roofs increases the probability of leaks within the building.

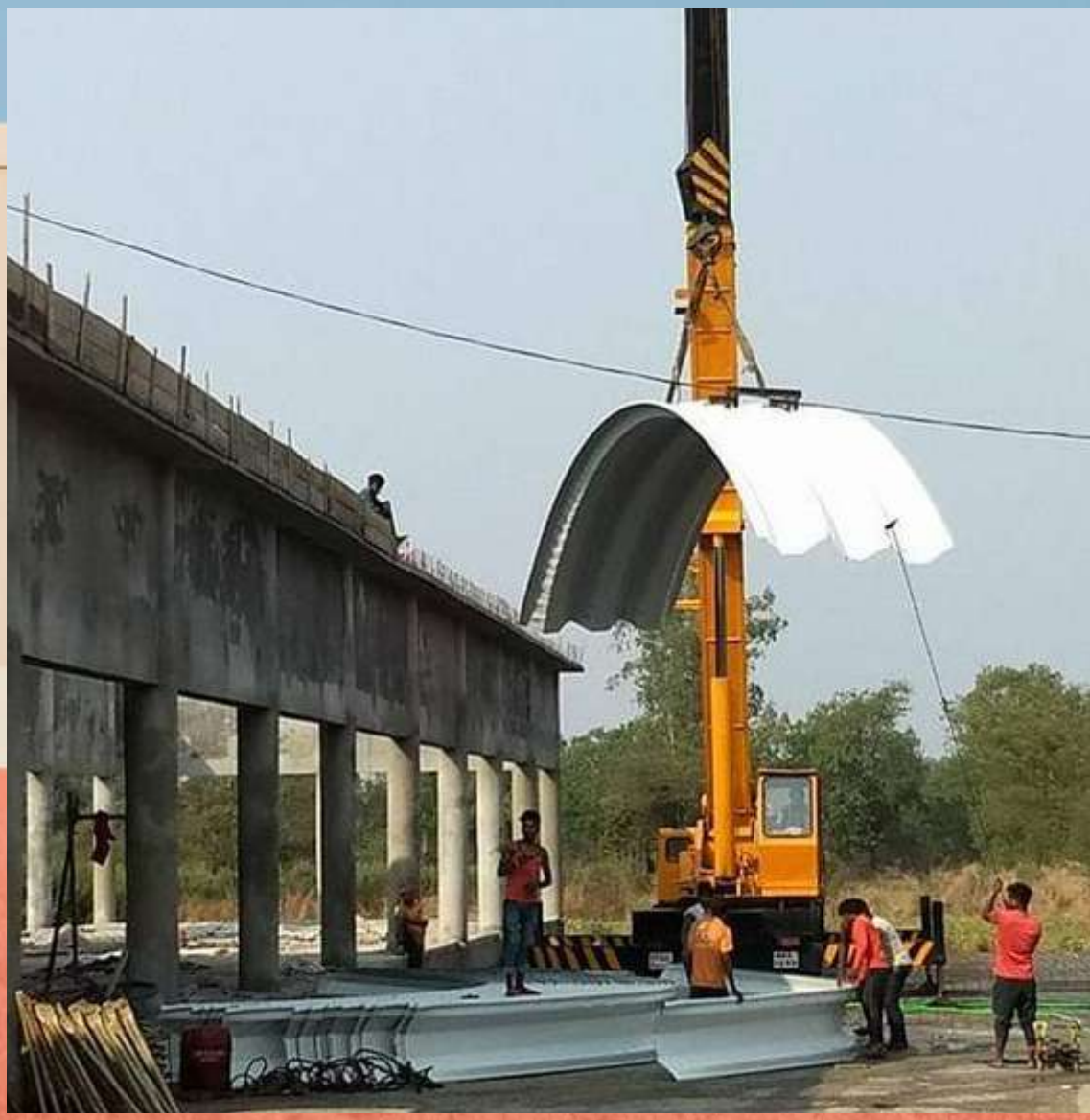
Installing the innovative technology known as structure-less/ truss-less/ arch roofing.

- This system doesn't demand any supporting structure, i.e. a truss.
- No overlapping joint is required at any side/s (i.e. longitudinal or transverse).
- The sideways joint is seamed by a machine, hence one cannot see any joint.
- No hole is driven into the sheet.The hole is driven at the end of the sheet, to pass the bolts to tightening, which is rested exactly over the RCC gutter beam.
- Imported galvalume sheets (carbon steel sheet coated with aluminum-zinc alloy by a continuous hot-dip process.) are cut to required sizes and moulded to the required shape, from galvalume coils.
- Two sheets are seamed together by placing hangers (this will facilitate receiving the lighting instruments).
- Sheets are lifted with a mobile tower crane and held in position till bolts are fixed at the ends into the RCC gutter through galvalume sheets, after tightening the bolts; epoxy coating is applied to the sheets where the bore is drilled.
- The next panel is lifted and aligned in line with earlier panels; then, bolts are driven into the RCC beam.
- The procedure is continued till one reaches the edge of the other end.
- Then, the gable wall is constructed or the opening is covered with the sheets/structural glazing.
- The lighting fixtures are then fixed /attached to the hangers.

SPECIFICATIONS

These Self Supported Roofing Sheets may be delivered and installed bearing the following preferences, or as per the wish of the client.

1. **Materials: Steel, Galvanized steel (galvalume sheets).**
2. **Gauge: 10 to 38 or as per the design.**
3. **Color: White, Cream, Red, Yellow, Gray, Blue or as per the wish of the client.**
4. **Features: Tamper proof, Corrosion resistant and Water proof.**
5. **Span: From 6 meters up to 35 meters.**
6. **Durability: 50 - 60 years.**
7. **Form: Curved sheet.**
8. **Formation Technique: Cold rolled, hot rolled or forged.**



SPECIFICATIONS

ROOFING MATERIAL (Galvalume Sheets).

Composition = Zinc (40-45%) + Aluminium (53-58%) + Silica (1-2%)
Thickness of the sheets = 0.8 mm to 1.6 mm

Spans, against the thickness of roofing sheets.

For Spans of Less than or equal to 16 meters, the thickness of the sheets is 0.8 mm
For Spans of 16 to 18 meters, the thickness of the sheets is 0.9 mm
For Spans of 18 to 21 meters, the thickness of the sheets is 1.0 mm
For Spans of 30 to 35 meters, the thickness of the sheets is 1.6 mm

POWDER COATING FOR RUST PROTECTION

Polyethylene Powder Coating – 70 Microns
Top side of the sheet – 40 Microns
Bottom Side of the Sheet – 30 Microns

DESIGN CONSIDERATIONS

Wind
Speed Consideration for Design – 180 Km/hr

Arc
Height (Apex) based on Span, General Thumb Rule = Span/5 (ex : Arc Height = 30/5 = 6m)

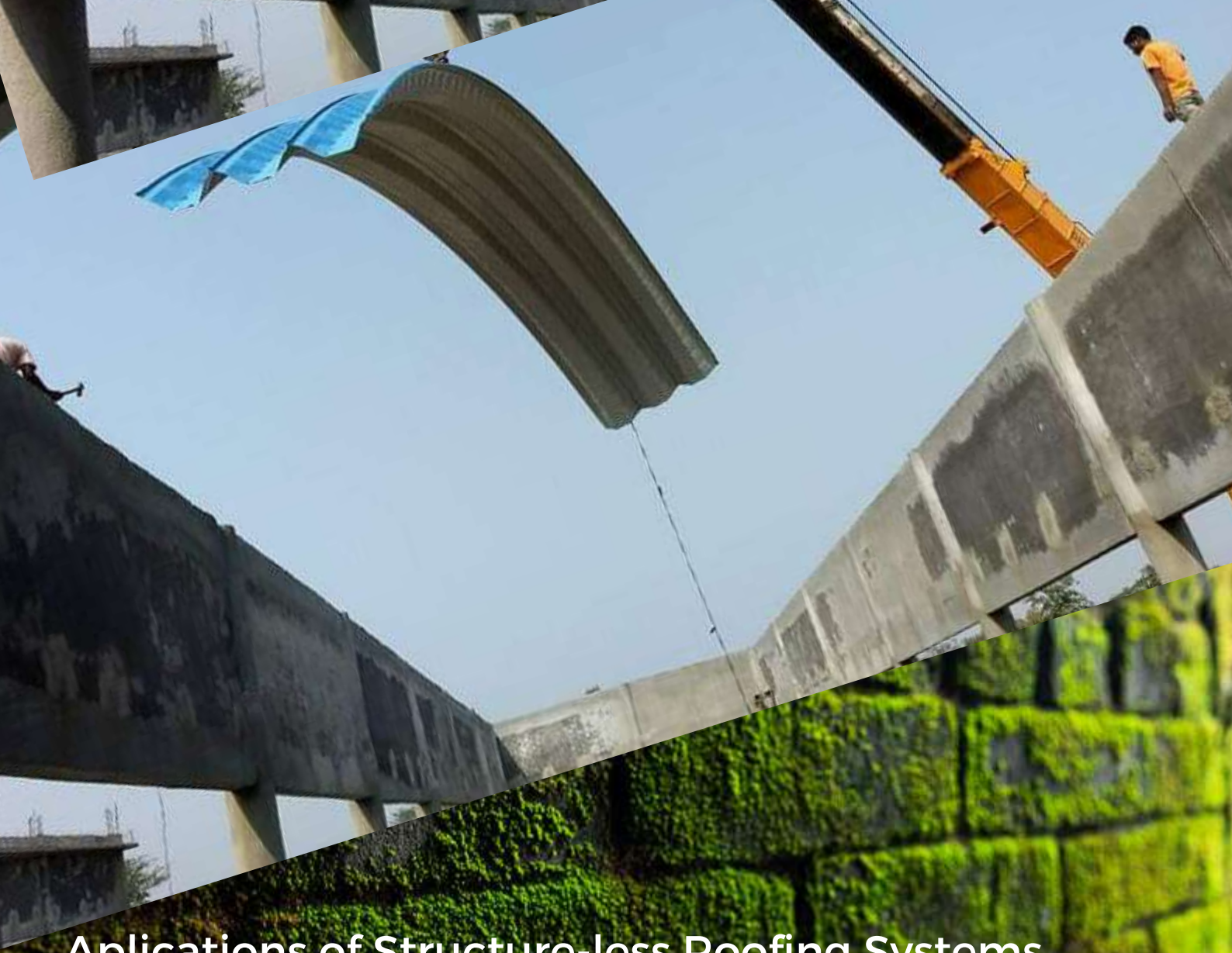
Load
Carrying Capacity = 20 – 30 Kg/sqm

OTHER PARAMETERS TO BE CONSIDERED

LIGHTING
Skylight can be provided using polycarbonate sheets at regular intervals to allow natural lighting.
Hangers can be provided to facilitate fixing of light fixtures (20-30kg point load).

COOLING
Air conditioning if required can be done by additional simple false ceiling.
Turbo Ventilators can be installed for enabling use of natural air outside the structure by sucking out the inside hot air (Can be used for non air conditioned units) [Does not require power)

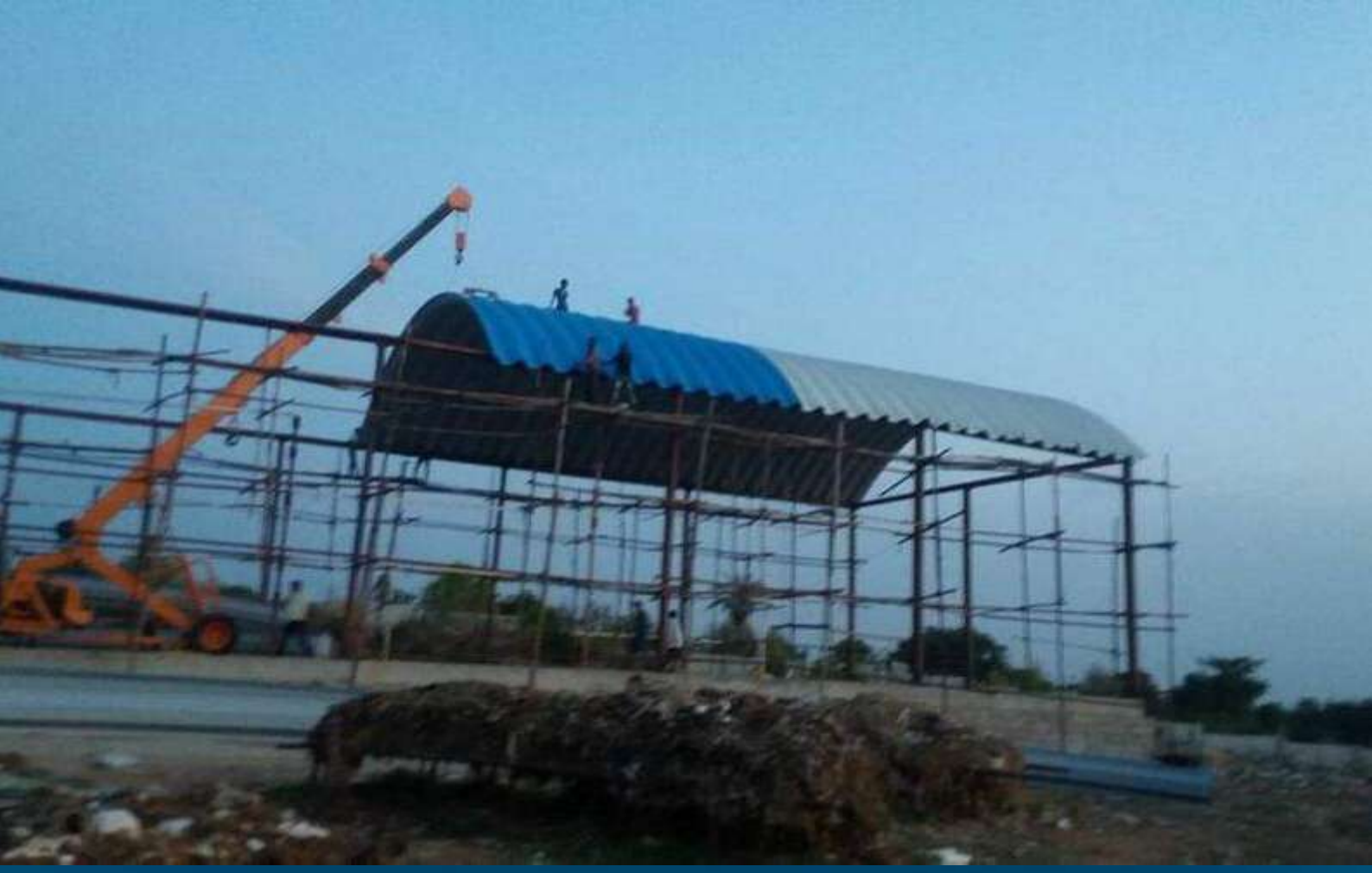
LEAKAGE
Protected against leakage as mechanical seaming of the roof metal is done by 8 layer mechanical press.



Aplications of Structure-less Roofing Systems.

These Self Supported Roofing Sheets have completely replaced conventional roofing and are used widely in applications like:

- Sports halls
- Flour mills
- Electrical & electronics
- Educational institutes
- Aircraft hangers
- Defense structures
- Community halls
- Special economic zones
- Agricultural
- Warehouse
- Bus Stations
- Clean Rooms
- Cold Storage



Aplications of Structure-less Roofing Systems.

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- Logistics & Warehousing
- Manufacturing industries
- Plastics & Packaging
- Food & Pharmaceuticals
- Engineering industry
- Textiles
- Aircraft Hangers
- Factories
- Garages
- Automobile industries
- Stadia/ Auditoriums
- Parking areas
- Swimming pools
- Recreation parks
- Restaurants
- Shopping malls
- Showrooms

MORE FROM MANDHIR CONSTRUCTION LIMITED

Besides Mandhir Construction Limited being a general building and civil contractor, we also specialize on the following construction areas:

- Flooring solutions, including polished floors.
- Roofing solutions.
- Silo construction.
- Warehouse construction.
- Large scale commercial building construction.
- Large scale residential building construction.
- Schools and Hospital construction.
- Renovations.
- Waterproofing solutions.
- Construction consultation.

Mandhir Construction Limited (NCA 1) is a specialty company with a leading position in the development and construction with high tech products for bonding, sealing, damping, reinforcing and protecting in the building sector and the motor vehicle industry.

Mandhir's product lines feature concrete admixtures, mortars, sealants and adhesives, structural strengthening systems, industrial flooring as well as roofing and waterproofing systems.

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