

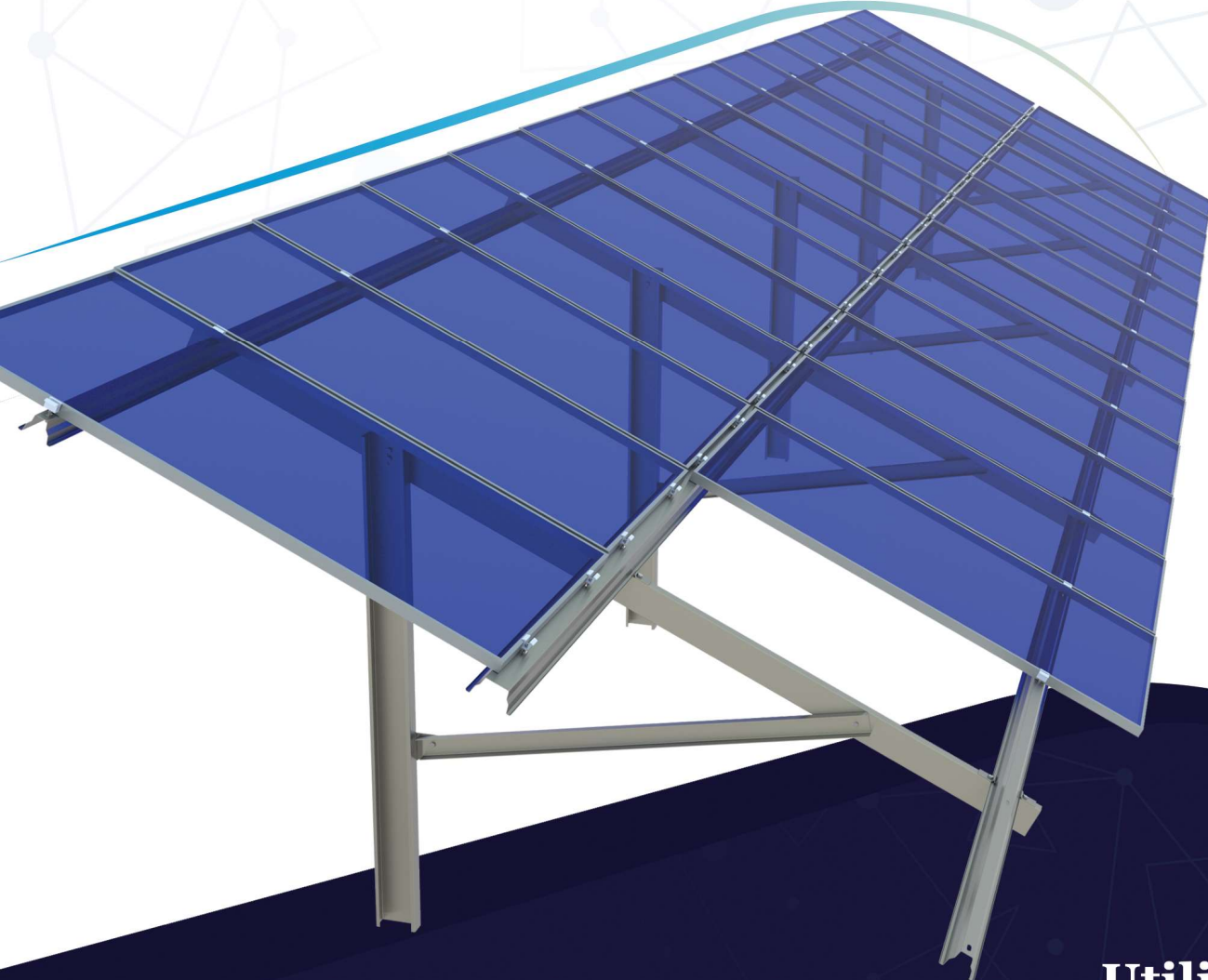
راهداران ایمن نقش جهان

کاتالوگ استراکچر خورشیدی

130 MW

Track Record

ENERECT Solar Mounting Structures



Utility Scale

Mounting Structures



Rahdaran
Imen
naghshejahan

The RAHDARAN company

RIN is founded about 40 years ago

- ✓ Located at Morcheh Khort industrial town, Isfahan, Iran
- ✓ High quality manufacturing facilities in an area of 35000 m² for production of various types of steel structures
- ✓ Top quality raw materials processed in a factory with a steel structure track record of hundreds of thousands of tons
- ✓ Automated, precise and fast manufacturing
- ✓ Certified galvanization process
- ✓ Experienced quality control team, working under European and American production standards

RIN is the leading manufacturers of

- ✓ Guardrails,
- ✓ Traffic signs,
- ✓ Custom-designed steel structures,
- ✓ Solar mounting structures

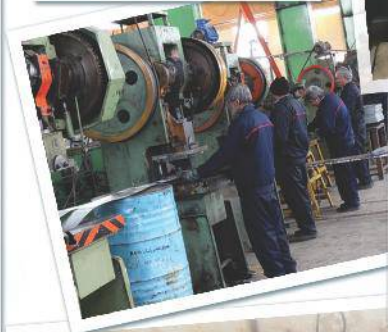
RIN owns several production certificates:

- ✓ Production certificate for Guardrail & road signs from Transportation Department of the Ministry of Road and Urban Development of Iran
- ✓ Production certificate for solar mounting structures from the Ministry of Industry, Mine, and Trade of Iran



The RIN prowess

- ✓ RIN holds a large amount of raw material in stock, in order to meet the strict deadlines of the projects.
- ✓ The equipments of the factory includes:
 - ✓ Roll to sheet cutting machines
 - ✓ Various crane systems
 - ✓ Cut-to-length lines
 - ✓ Straightening machines
 - ✓ Various types of press machines
 - ✓ CO₂ welding machines
 - ✓ Several roll-forming machines
 - ✓ Clamp & spacer progressive production lines
 - ✓ Various press brake machines
 - ✓ CNC cutting machinery
- ✓ RIN also holds a large stock of finished goods available for immediate supply



Design of Solar Mounting Structures

Loading calculations and design requirements, based on European and American standards

Turnkey optimized solution making for utility-scale structures:

- ✓ Design of piles according to soil characteristics and loadings
- ✓ Design of overall configuration based on site conditions; wind, snow, soil properties, seismic loads, etc.
- ✓ Customized detailed design of all parts according to client requirements

Optimized detailed designs exclusively done for every individual project aimed at:

- ✓ Obtaining the lowest structure weight and cost while guaranteeing the required reliability level
- ✓ Speeding up installations

Finite element analysis

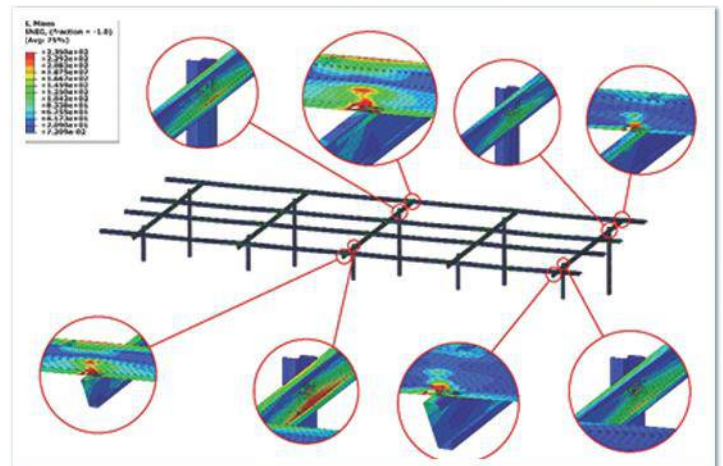
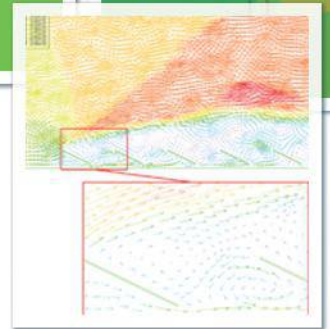
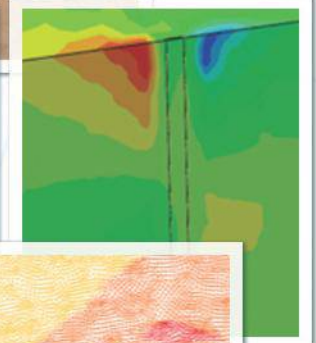
- ✓ Performed to scrupulously study the detailed behavior of each customized design under critical loadings
- ✓ Performance of simulation tools verified by physical tests

Design done in conformity with:

- ✓ Manufacturing methods
- ✓ Fast installation concerns
- ✓ Long-term Maintenance
- ✓ Possible pile and racking installation errors



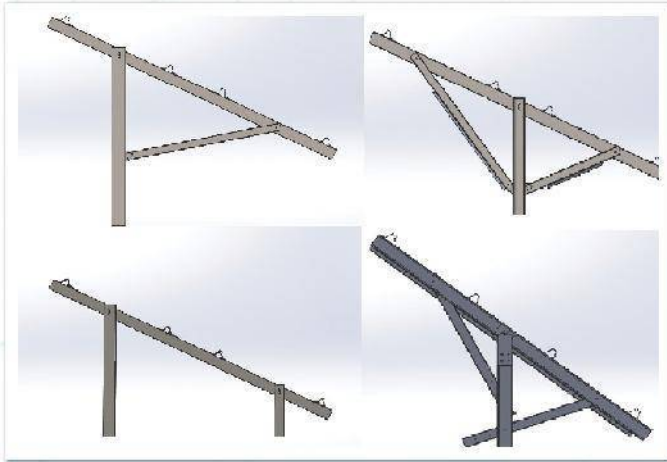
American Iron and Steel Institute



Engineering Services

Geotechnical survey of the soil

- ✓ Topographic survey of the site
- ✓ Physical characteristics of the soil
- ✓ Chemical properties of the soil
- ✓ Ramming & Pull-out test of the poles

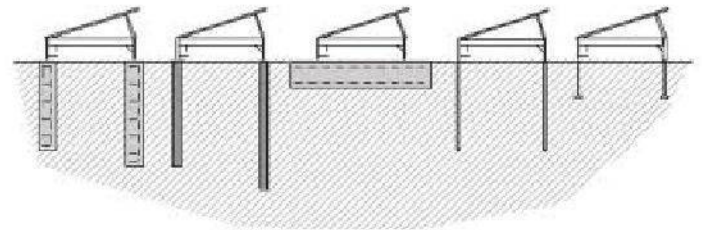


Preparing the optimum design according to:

- ✓ Historical climate data
- ✓ Soil condition & Geotechnical data
- ✓ Topography & geographic location of the site
- ✓ Electrical design of the plant

Optimum selection of the foundation in accordance with:

- ✓ Soil condition
- ✓ Executive conditions of the site



Optimum layout of the tables according to:

- ✓ Site dimensions & topography
- ✓ Electrical string size
- ✓ Historical wind velocity & direction data

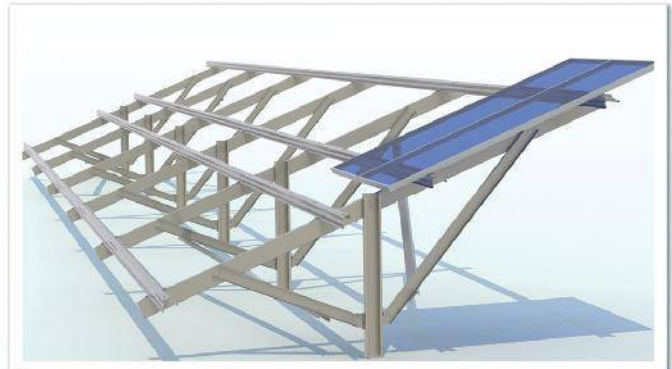
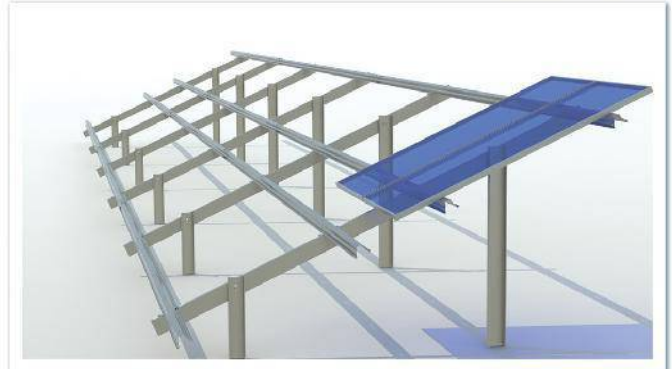
General Specifications



Module Layout	Portrait-landscape
Compatible Modules	60/72 cell framed/frameless modules
Tilt Angles	Fixed 15-35 degrees, adjustable seasonal tilt angles, single-axis trackers
Poles	Single or double poles, Hot dipped galvanized S355JR rammed piles and driven helical piles, Concrete foundation posts
Girders, Purlins	Hot dipped Galvanized S235JR/S275JR/S355JR Steel, 60 and 70-group aluminum alloys
Clamping (module fixation)	Easy-to-install pre-assembled clamps consisting of extruded aluminum parts + especially designed nuts, frameless module clamps for different module thicknesses
Module Frame bonding/grounding	Stainless Steel Grounding Washers
Structural Design and Reliability Standards	Project specific structural calculations based on: <ul style="list-style-type: none"> • Euro-code EN 1990 to 1999 • ASCE 7-10/IBC 2015 • ICC-ES AC428, UL 2703 • JSA JIS C 8955 • JSA JIS C 8956 • Iranian National Building Code
Design Calculations	- Providing comprehensive and optimized turnkey customized solutions for the whole set of poles and racking parts according to project conditions - Static finite element analysis, Seismic analysis, Pile length calculations, Pile and soil behavior analysis, Physical ramming and pull-out tests
Wind speed	Optimized design based on wind speeds of 60 to 200 km/h
Snow load	Optimized design based on snow loads of 25 to 300 kg/m ²
Installation	Fast and easy installation. All joints bolted. Easy to install mid-clamps
Warranty	10 years for structure, and 20 years for corrosion

Fixed Tilt Ground-Mount Structures

- ✓ Single-post and double-post designs fitting project climate and soil conditions
- ✓ Both module orientations (portrait/landscape) in customized number of panel rows (1 to 6)
- ✓ Available and adaptable for different types of posts: rammed piles, ground screws, pre-drilled piles, concrete slab foundations, concrete piles, etc.
- ✓ Universal connections embedded for the sake of easy installation especially for rammed pile projects
- ✓ Different profiles available for rammed piles, benefiting from different shapes, thicknesses and material aimed at optimizing costs based on individual project soil conditions
- ✓ Minimum number of structure components featuring error-tolerant connection mechanisms



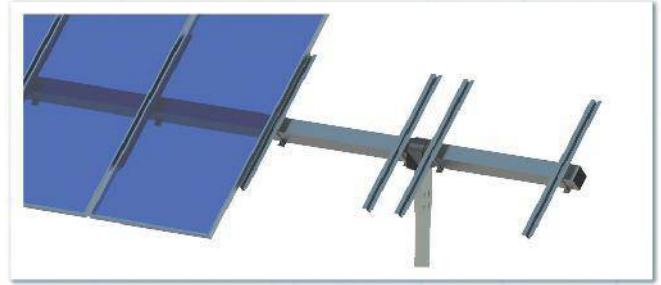
Seasonally Adjustable Tilt Angle Ground-Mount Structures

- ✓ Cost-efficient adjustable tilt structures specifically designed for utility-scale applications
- ✓ Safe manual tilting by means of specially designed apparatus
- ✓ Robust structure design for preventing any harm to modules while manual tilting
- ✓ Adaptable for different types of posts and different pile sections
- ✓ Fast and easy installation and tilt adjusting, relying on minimum structure elements and adjustable parts



Single-axis Trackers

- ✓ Horizontal single-axis trackers with tracking range of 50 degrees
- ✓ Cost-efficient structure designs based on project requirements and performance details
- ✓ Portrait 1-2 row plus landscape 2-4 row module configurations
- ✓ Efficient design for fast installation and easy maintenance



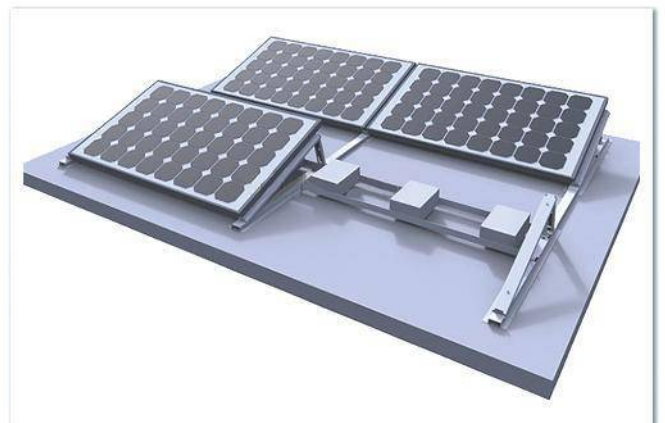
Fixed & Tracker Structures for Bifacial module

- ✓ Fixed structures and trackers designed specifically to cut shading from module rear side
- ✓ All purlins and structure elements located in between the panels or the junction box area
- ✓ Set up for bifacial specific arrays heights (minimum ground clearance of 1.2 to 1.5m)
- ✓ Minimum number of posts for minimizing the rear side shading
- ✓ Compliant with seasonal tilt adjusting mechanism



Roof-Mount Fixed Structures

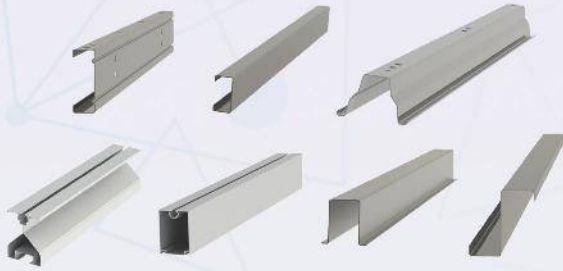
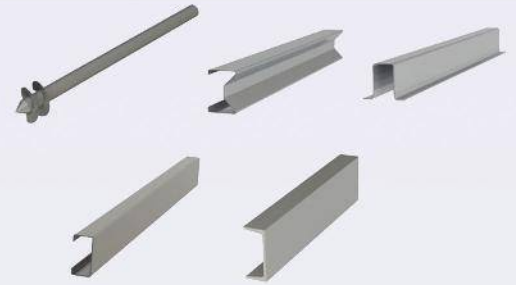
- ✓ Pitched roof structures with proper connections based on different roof material
- ✓ Flat roof structures for customized panel configurations and number of rows
- ✓ Extendable to bifacial module structure types and adjustable tilt structure in case of proper connection to the flat roof
- ✓ Special solutions for projects with low roof area



Rammed & Driven Piles

Steel driven piles of different shape and dimensions:

- ✓ Designed optimally according to the soil characteristics, structure configuration, and wind, snow, & earthquake loadings of each projects
- ✓ Designed according to the racking type



Structure Profiles

- ✓ Different types of cold-formed steel profiles designed in accordance with racking type, structure configuration, span length, module arrangement & loadings of each projects
- ✓ Improved trapezoidal profiles exclusively developed for high loadings and long spans

Connections & Fastening Mechanisms

- ✓ Universal and easy to install connection mechanisms
- ✓ Especial fixation washers to avoid movements in long-term vibrations
- ✓ Several mechanisms provided to compensate pile ramming errors in different directions and angles
- ✓ Easy and fast purlin connections
- ✓ Up to 70% of connections can be provided pre-assembled



1.7
Bolts per panel

Quick racking system and module installation

Satisfying the most conservative European and American standard requirements

Project-specific design for optimal structure weight and cost

Lowest number of elements and fast connections



5.5 kW
per man-hour

Sample Projects



Sarbisheh 7 MW plant

Single-post design, Two modules in portrait, Concrete pile on uneven terrain



Talkhouncheh 1 MW plant

Double-post design, Two modules in portrait, Concrete slab foundation

Sample Projects



Buin Zahra 1 MW plant

Double-post design, Three modules in portrait on 4 purlins, Concrete slab foundation



Kohmarreh 10 MW plant

Double-post design, Two modules in portrait, Rammed piles

Sample Projects



Hasan abad 5 MW plant (under construction)

Single-post design, Two modules in portrait, Rammed piles



Shush 1 MW plant

Double-post design, Two modules in portrait, drilling + discrete concrete foundations

Sample Projects



Kooshk Bafgh 10 MW plant

Single-post design, Two modules in portrait, Rammed piles



Damghan 10 MW plant (2MW commissioned)

Single-post design, Two modules in portrait, Rammed piles

Sample Projects



Takestan 1 MW plant

Single-post design, Two modules in portrait on 3 purlins, Rammed piles



Dashti 2 MW plant

Single-post design, Two modules in portrait, Rammed piles

Sample Projects



Bahreman 10 MW plant

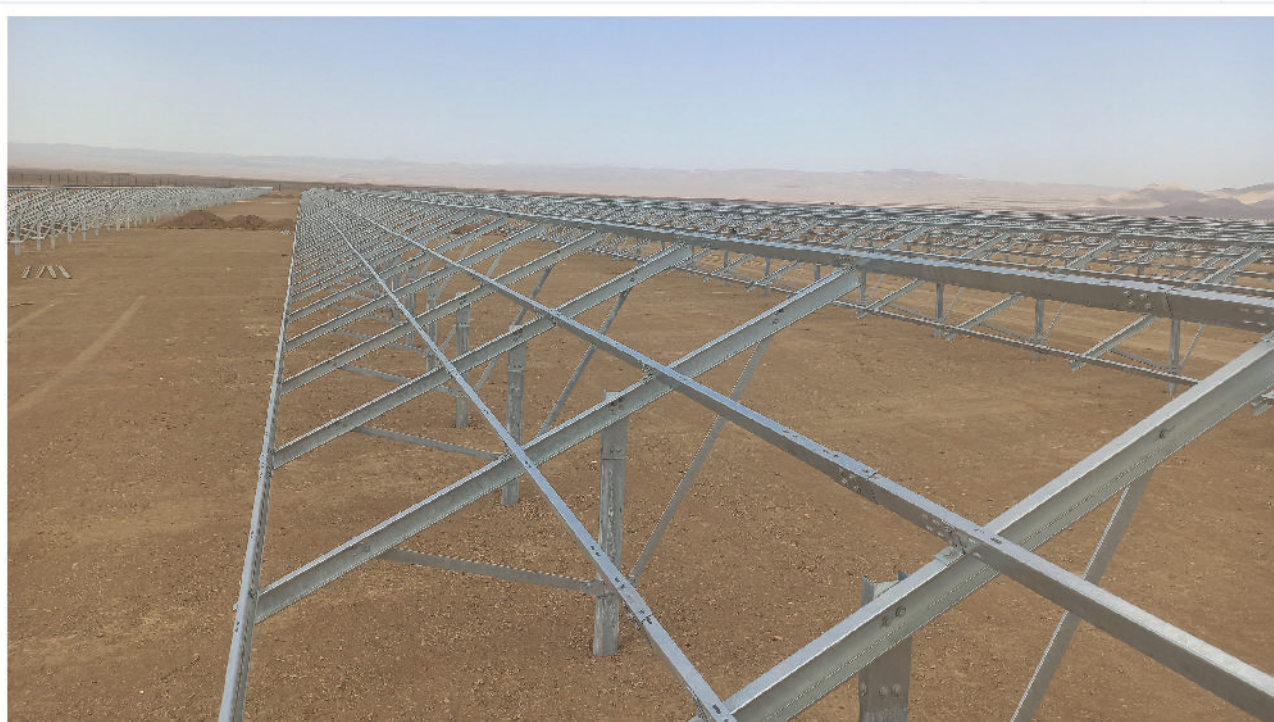
Single-post design, Two modules in portrait, Rammed piles



Majlesi 10 MW plant

Two-post design for bifacial modules, Two modules in portrait, Rammed piles

Sample Projects



Esfandaghe 10 MW plant

Single-post design, Two modules in portrait, Rammed piles



Kahnouj 5 MW plant

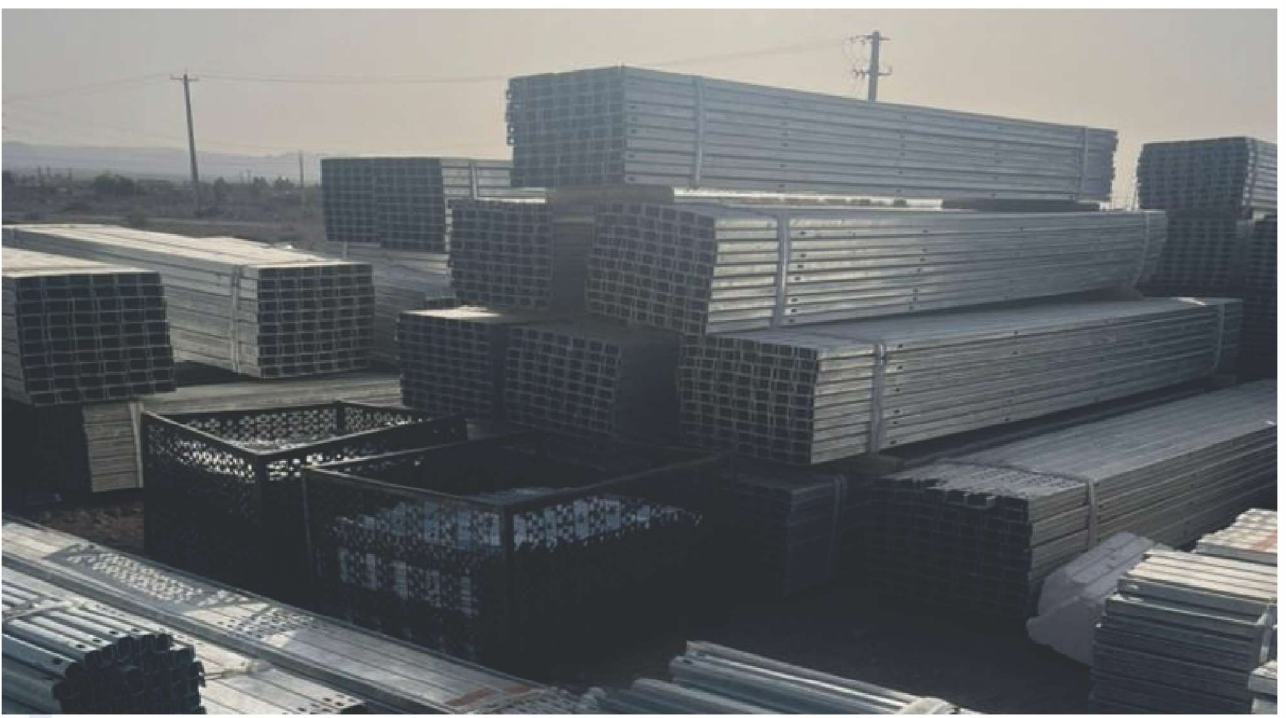
Double-post design, Two modules in portrait, Rammed piles

Sample Projects



Zarand 10 MW plant

Single-post design, Two modules in portrait, Rammed piles



Safaiyeh 10 MW plant (Under Installation)

Single-post design, Two modules in portrait, Rammed piles

Sample Projects



Over 22MW solar power plant (under construction)

Semnan 10MW, Sirjan 10MW, Rafsanjan 2.5MW



Sarvestan 1 MW plant

Two-post design, Two modules in portrait, Concrete Slab Foundation

Sample Projects



Marvdasht 1 MW plant

Adjustable tilt single-post design, Two modules in portrait, Concrete foundation



8 MW of flat roof structures

Single/double/triple post designs, modules in different configurations,
Concrete/combinational foundations

RAHDARAN

C O R P O R A T I O N

شرکت راهداران ایمن نقش جهان

اصفهان، شهرک صنعتی مورچه خورت، بوعلی ششم، پلاک ۵۲۵

تلفن: ۰۹۱۴۱۰۰۷۶۶۲ | فاکس: ۰۳۱-۴۵۶۴۳۰۸۷

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