



LIGHT RAIL TRANSIT (LRT)



**OCS, FLEXIBLE, RIGID AND RETRACTABLE CATENARY
FROM FOUNDATION TO PANTOGRAPH AND
ELECTRICAL EQUIPMENT AND MORE**

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FROM FOUNDATION TO PANTOGRAPH AND ELECTRICAL EQUIPMENT**

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TYPES OF TRAMWAYS

TOURIST TRAM

- Equipped with Trolley or Pantograph
- Low Speeds (Max. 30 km/h)
- Adapted Old Vehicles
- Layout with Many Curves
- In General Not Compensated Lines



URBAN TRAMWAY

- Equipped with Pantograph
- Average Speeds (Max. 60 km/h)
- In General Compensated Lines
- Cross Curves and Rounds without Brackets
- Distance Between Stops ≤ 500 m



LIGHT METRO

- Equipped with Pantograph
- High Speeds (Max. 80 km/h)
- Completely Compensated Lines
- Larger Radius Curves
- Always Suspension with Poles
- Distance Between Stops ≥ 500 m





TECHNICAL SERVICES

MVA POWER TOGETHER WITH OUR PARTNERS AND CERTIFIED MANUFACTURERS WITH 25 YEARS OF EXPERIENCE, IS HIGHLY QUALIFIED TO PROVIDE THE FOLLOWING SERVICES:

- Analysis and Design the Overhead Catenary Systems and Assemblies included in the scope of work below as per the applicable Codes and Standards and Customer Requirements
- Shop Drawings, Workbooks, and all Technical Information of each item, Approved and Certified by Professional Engineers with Canada Jurisdiction
- Calculations and Design Reports
- Inspection and Test Reports as required of OCS Systems
- Installation Training, Technical Assistance, and Supervision of OCS Systems
- Installation, Inspection, and Certification of OCS Systems
- Installation, Operation, and Maintenance of OCS Systems
- Other Special Project Analyses such as Energy Flow Simulation and RAMs Studies.

SCOPE OF WORK

MVA POWER SCOPE OF WORKS INCLUDES, BUT IS NOT LIMITED TO THE DESIGN, MANUFACTURING, AND/OR SUPPLYING OF THE FOLLOWING ITEMS:

- OCS Poles and other HDG Steel Supports
- Contact Wires, Messenger Wires, and other Electrical and Ground Wires
- OCS Arms/ Cantilevers including Brackets
- Fixed Termination Equipment
- Spring Termination Equipment
- Weight Tensioning Devices (Balance Weight)
- Mid-Point Dead Ends • Head-Span Assembly
- Surge Arrestors and Feeder Pole Assemblies
- Insulators and Section Insulators
- Disconnect and Transfer Switches
- Pole Guys (Down and Head Guys) Assemblies
- Contact Wire Bonds (Jumpers and Contact Bridges)
- Galvanized Steel Wires
- Stainless Steel Wires
- Rigid Rails/ Conductor and Assemblies
- Droppers
- Spare Parts

MATERIAL SUSPENSION AND SUPPORTS

- Using Metal Wire with Insulators
- Using Synthetics Insulated Cables

STAINLESS STEEL AND GALVANIZED WIRES ROPE



ADVANTAGE OF SYNTHETIC ROPE PARAFIL TYPE A

- Isolante
- Reduction in Number of Components
- Labour-Saving
- Reduced Visual Impact
- Resistance to Ice Formation
- Resistance to Corrosion
- Increased Useful Life of the Contact Wire
- Temperature Insensitive
- Not Dangerous in the Event of Breakage



PARAFIL TYPE A

- Terylene Fibres (White Polyester)
- Acceptable Mechanical Resistance
- Halogen-Free
- Without Nucleus of NH
- Not Dangerous in Case of Fire
- Generates Water Vapour and CO2



CANTILEVER MATERIALS AND TYPES

METAL BRACKETS

- Manufactured with Galvanized Steel Pipe
- High Rigidity
- They Admit to be Painted
- Suitable for Continental Climates (Low Humidity)
- Economic Price
- All Lengths



INSULATING BRACKETS

- Manufactured with Isophthalic Polyester Bars Reinforces with Fiberglass and UV Protection
- Good Rigidity
- Resin Painted in Origin (Not Painted Later)
- Suitable for Continental Climates (Low Humidity)
- All Lengths
- Higher Price than Metallic for Lengths Above 3m
- Φ of 42 mm and 55 mm

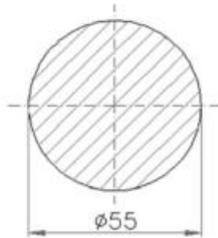


MECHANICAL FEATURES OF INSULATING BRACKETS

- Material: Fiberglass and Isophthalic Polyester with UV Protection
- Colour: Green or Grey RAL7036
- Weight: 4.5 kg/m

1. DESCRIPTION

- 55 mm \varnothing bar



2. MATERIALS

- Isophthalic Polyester Resin (Particularly Suitable for Outdoors)
Reinforced with Fiberglass with a Stabilizer to Resist UV Radiation

3. GEOMETRIC FEATURES

- Bar \varnothing : 55mm
- Standard Length: 4 y 8 m
- Weight: 4.5 kg/m

4. ANTI-MOISTURE FEATURES

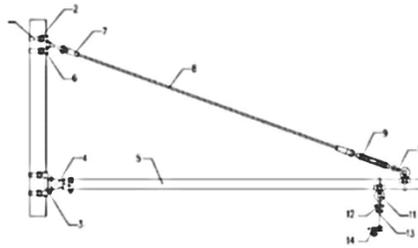
- The Glass Fibre Reinforcement is 0.3 mm Outer Surface, so Polyester Surface Forms Layer of Self-Protective Varnish that tends to Crack and Disappear after a few years

5. DEFORMATION RESISTANCE

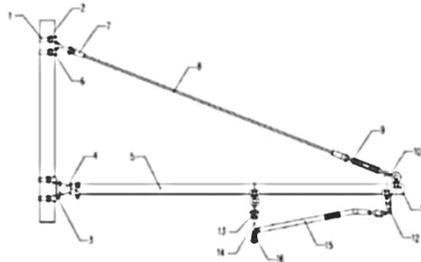
- Deformation by Compression of 4 m Length Bar Scope of the Single and Double Bracket

TYPICAL MOUNTS OF TRAMWAY CATENARY (Flexible Catenary)

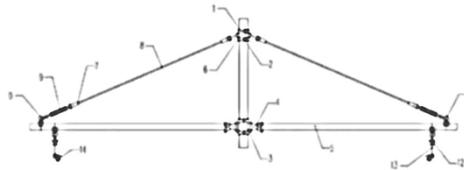
SIDE POST SIMPLE WAY



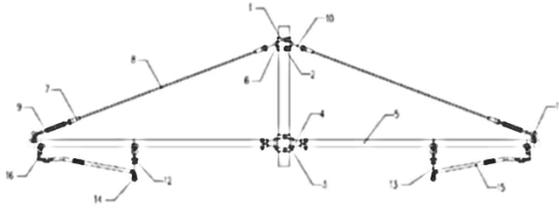
SIDE POST CURVE SIMPLE WAY



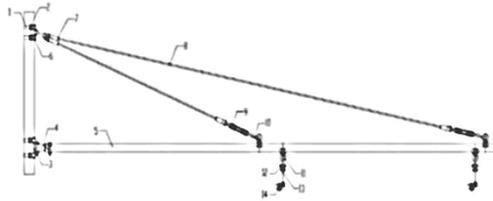
POLE IN RAILWAY GAUGE TWO BRACKETS



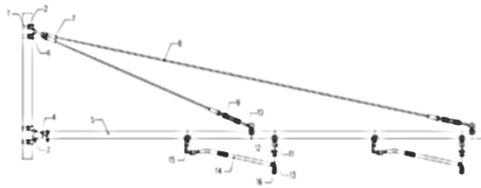
POLE IN RALLWAY GAUGE TWO BRACKETS



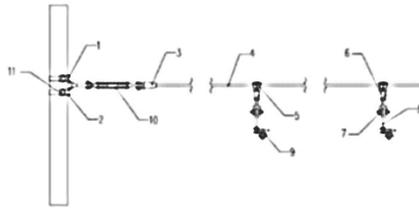
SIDE POST STRAIGHT FOR TWO WAYS



SIDE POST STRAIGHT FOR TWO WAYS



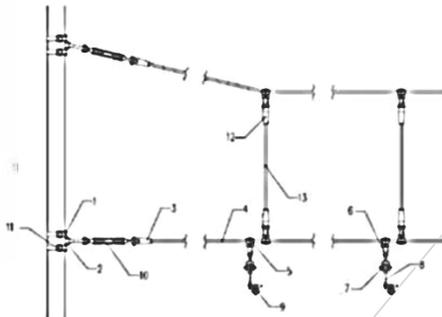
TRANSVERSE STRAIGHT TWO WAYS



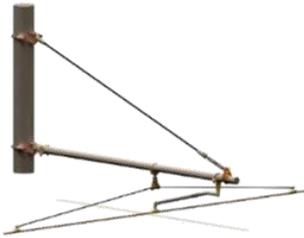
TRANSVERSE STRAIGHT TWO WAYS



FUNICULAR PORCH TWO WAYS



SINGLE TRACK – CURVE LINE – POLE OUTSIDE



Single Cantilever



Double Cantilever



Single Cantilever – Big Length

2 TRACKS - CURVE LINE - POLE



2 TRACKS – CURVE LINE – HEAD SPAN



2 TRACKS – HEAD SPAN



2 TRACKS – CURVE LINE – SECTIONING (AXIS)



2 TRACKS – STRAIGHT LINE – SECTIONING (AXIS)



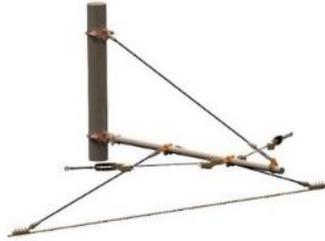
2 TRACKS – CURVE LINE – HEAD SPAN



2 TRACKS – CURVE LINE – POLE OUTSIDE



FIX POINT



SMALL RADIUS CURVE



Depot Installation

SECTION INSULATOR

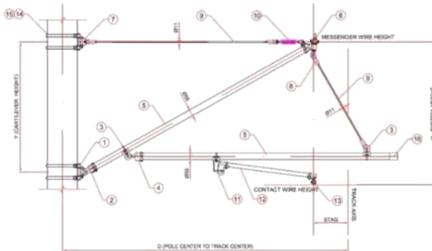


Asymmetrical

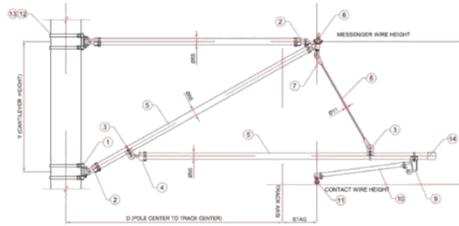


Symmetrical

PULL-OFF-CANTILEVER



PUSH-OFF CANTILEVER



COMPONENTS



ROUND POLE ANCHORAGE



BRACKET FOOT



EYE FIXATION



SUSPENSION PULLEY



SUPPORT ARM



PARAFIL STAY



TURNBUCKLE



INSULATED BRACKET



ANCHOR POLE DETAIL



DELTA SUSPENSION



STAYED ARM



RIGID AND RETRACTABLE CATENARY

CONTACT WIRE SUSPENSION FOR: TUNNELS, BRIDGES, STATIONS, DEPOTS AND WORKSHOPS

ADVANTAGES IN TUNNELS AND OUTSIDE

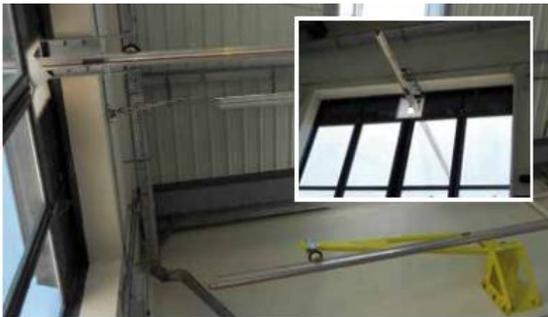
- Decrease Height of Tunnels (Economy in New Construction)
- Adaptation to Tunnels with Reduced Height Avoided the Fall of Catenary
- Avoiding Falls Catenary
- Suppression of Points of Supply for the Great Conductive Section
- Minor Components with Saving in Installation and Maintenance Stock
- Not Mechanical Tension (Reduction of Maintenance)
- Adaptable to All Types of Electrical Voltage (from 750 v. CC. up to 25 KV CA)



CONTACT WIRE SUSPENSION FOR: TUNNELS, BRIDGES, STATIONS, DEPOTS AND WORKSHOPS

ADVANTAGES IN DEPOTS AND WORKSHOPS

- Access to the Roof of the Trains for Maintenance Operations
- Interface with the Gateways, Cranes, Doors, Alimentations, etc.
- Safety for Workers and Material



SUSPENSION OF OUTDOOR CONTACT WIRE

OUTDOOR ADVANTAGES

- Transitions Are Avoided
- Suspensions More Lights
- There Are Not Compensations



COMPONENTS



RIGID BAR

It consists of a extruded aluminum bar, lengths of 10 or 12 m with a characteristics section, used for the conduction of the current feeding of units subway and railway.

BAR RAMP

Bar of extruded aluminum in lengths of 4, 6, 10 or 12 m with a slight curvatures along 1,5 m in order to smooth the entry of the pantograph under overlaps and transitions. Alloy 6106 TS.



CONNECTION PLATES

These plates serve as connections between the profiles. They are adapted to the internal form of the bar and give a exact transition and continuity.



BAR INSULATOR 3 KV CC.
AISLADOR DE BARRA 3 KV CC.



INSULATE BRACKET 25 KV CC.
MÉNSULA AISLANTE 25 KV CC.



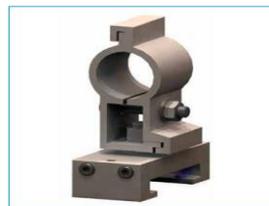
INSULATOR WITH SLIDING CLAMP 1,5 KV CC.
AISLADOR CON GRIFA DESLIZANTE 1,5 KV CC.



INSULATOR WITH BLOCKING CLAMP 1,5 KV CC.
AISLADOR CON GRIFA NO DESLIZANTE 1,5 KV CC.



PIPE SUSPENSION WITH CLAMP
SUSPENSIÓN DE TUBO CON ABRAZADOR



SNORKEL SUSPENSION WITH CLAMP
SUSPENSIÓN SNORKEL

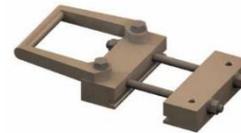
DOUBLE ELECTRIC POWER FEED

Unit consisting of two aluminum flanges that are attached to the PAC profile using 2 stainless steel threaded rods. The flanges will have two holes, each of them allowing to fix the power wire terminals or jumper wire.



EARTHING CLAMP WITH STIRRUP

To do the maintenance work, install a plate of the same material with a stirrup which is suspended by the earthing bar.



FIX POINT ASSEMBLY

To direct the expansion process and prevent displacement of rigid catenary, a fix point is located in the middle of each section. We must control the forces due to the expansion of the profile and others caused by the friction of the pantograph.



WEAK FIXED POINT

Unit consisting of two aluminium flanges that are attached to the PAC-110 or PAC 80R profile through two threaded rods. It is disposed a flange on each side of the hanger clamp, blocking the movement at that point. System used in short lengths as diagonals double crossovers



EXPANSION JOINT

This element can absorb the length variations because of the temperature changes experienced in the catenary sectioning. It can absorb expansion up to 1m in length. No maintenance is required. Rated Voltage. - 25kV



SECTION INSULATOR

Set formed by profiles, skates and insulators used to maintain two contiguous sections of rigid catenary isolate, in railroad and subway.

PROJECT REFERENCES AND MAIN CLIENTS

LRT Project References in Canada:

- Ottawa Light Rail Transit - LRT: Design, Manufacture and Supply of OCS POLES, OCS Flexible and Rigid Catenary Systems, from 2015 to 2020
- Eglinton Crosstown LRT: Design, Manufacture and Supply of OCS POLES, OCS Disconnect Switches and Other Parts, from 2019 to 2020
- Finch West Light Rail Transit - LRT: Design, Manufacture and Supply of OCS POLES, OCS Flexible and Rigid Catenary Systems, from 2020 to 2023
- The Réseau Express Métropolitain (REM), 26 Stations, 67 km. Discover the New Transport Network for Greater Montréal. LRT, Partially Design, Manufacture and Supply of OCS Flexible Catenary, from 2020 to 2024
- Hurontario Light Rail Transit LRT: Design, Manufacture and Supply of OCS POLES, OCS Rigid and Retractable Catenary Systems, from 2021 to 2024

Main Clients:

- OLRT Contractors
- CYMI Canada
- ENGIE Transport CM Canada Inc.
- EQUANS Transport CM Canada Inc.
- Alltrade Industrial Contractors Inc
- Alstom Transport Canada Inc.
- Crosslinx Transit Solutions - Constructors



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