CABLE TRAY

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- WHAT IS CABLE TRAY

- Types of Cable Tray

- Types of Material of Cable tray

- Installation Procedure of Cable Tray

- Support Procedure of Cable tray

✓ **WHAT IS CABLE TRAY**

What is a Cable Tray System? As per the National Electrical Code, a cable tray system is "a unit or assembly of units or sections and associated fittings forming a rigid structure

✓ **What does this mean?**

Cable trays support cable the way that roadway bridges support traffic.
A bridge is a structure that provides safe passage for traffic across open spans.
Cable tray is the bridge that allows for the safe transport of wires across open spans.

✓ **What standards/guidelines are available for cable tray systems?**

1. The National Electrical Code publishes the standards for all types of electrical applications. Articles 318, 250, and 800 cover various aspects of cable tray systems.
2. N_E_M_A, (National Electrical Manufacturers Association), is an association comprised of the major cable tray manufacturers in the industry. This committee has published three documents to date: NEMA VE1, FG1, and VE2.

✓ **What standards/guidelines are available for cable tray systems?**

NEMA VE1:
Covers general cable tray definitions, manufacturing standards, performance standards, test standards, and application information. NEMA FG1:
Addresses the standards for fiberglass cable tray systems.

NEMA VE2 :
Covers cable tray installation guideline which covers receiving

✓ **What types of Cable Tray are available ?**

1. Ladder Tray
2. Solid Bottom Cable Tray
3. Trough (ventilated) Cable Tray
4. Channel (perforated)Cable Tray
5. Wire Mesh Cable Tray
6. Single Rail Cable Tray

1. Ladder Cable Tray:

• Solid side rail protection and system strength with smooth radius fittings and a wide selection of materials and finishes.

• maximum strength for long span applications standard widths of 150, 300, 450, 600, 750, and 900 millimeters.

• standard depths of 50, 75, 100, 125 and 150 millimeters

• standard lengths of 3 to 6 meters

• the rung spacing of 150, 225, 300, and 450 millimeters

• Ladder cable tray is generally used in applications with intermediate to long support spans, 3meters to 6 meters.

1. Ladder Cable Tray:
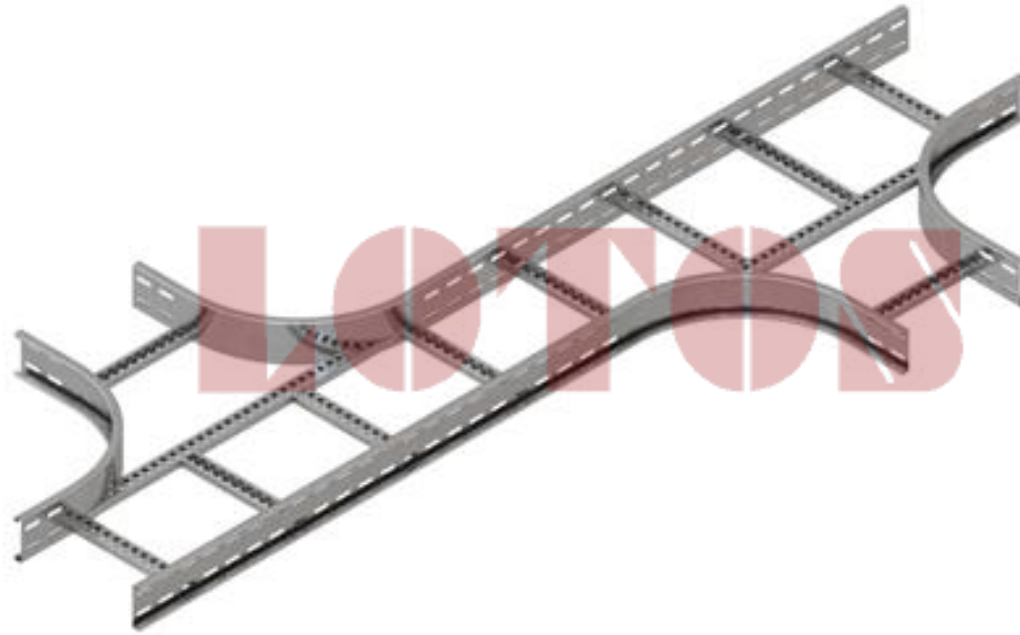
2. Solid Bottom Cable Tray:

- Non ventilated continuous support for delicate cables with added cable protection available in metallic and fiberglass.

- Solid bottom metallic with solid metal covers for non-plenum rated cable in environmental air areas

- standard widths of 150, 300, 450, 600, 750, and 900 millimeters

- standard depths of 75, 100, 125, and 150 inches

- standard lengths of 3, 6, meters Solid Bottom cable tray is generally used for minimal heat generating Electrical or telecommunication applications with short to intermediate.

2. Solid Bottom Cable Tray:

3. Trough Cable Tray:

• Moderate ventilation with added cable support frequency and with the bottom configuration providing cable support every 4 inches. Available in metal and nonmetallic materials.

• standard widths of 150, 300, 450, 600, 750, 900 millimeters 3.3. standard depths of 75, 100, 125, and 150 millimeters

• standard lengths of, 3000, 6000 millimeters

• fixed rung spacing of 100 millimeters on center Trough cable tray is generally used for moderate heat generating applications with short to intermediate support spans of 0.6, 3, 6 meters.

3. Trough Cable Tray:
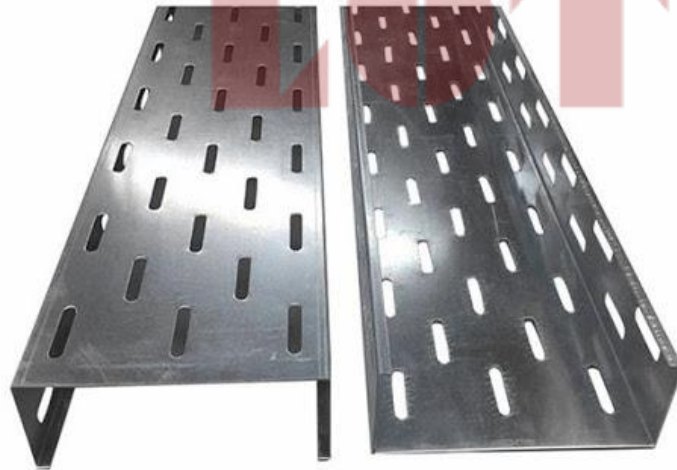
4. Channel Cable Tray:

- economical support for cable drops and branch cable runs from the backbone cable tray system.

- standard widths of 75, 100, and 150 millimeters in metal systems and up to 200 millimeters in nonmetallic systems.

- standard depths of 30 to 50 millimeters in metal systems and 25, 30, 40, and 50 millimeters in nonmetallic systems

- the standard length of 3, 4, and 6 meters Channel cable tray are used for installations with limited numbers of tray cable when the conduit is undesirable. Support frequency with short to medium support spans of 1.5 to 3 meters.

4. Channel Cable Tray:
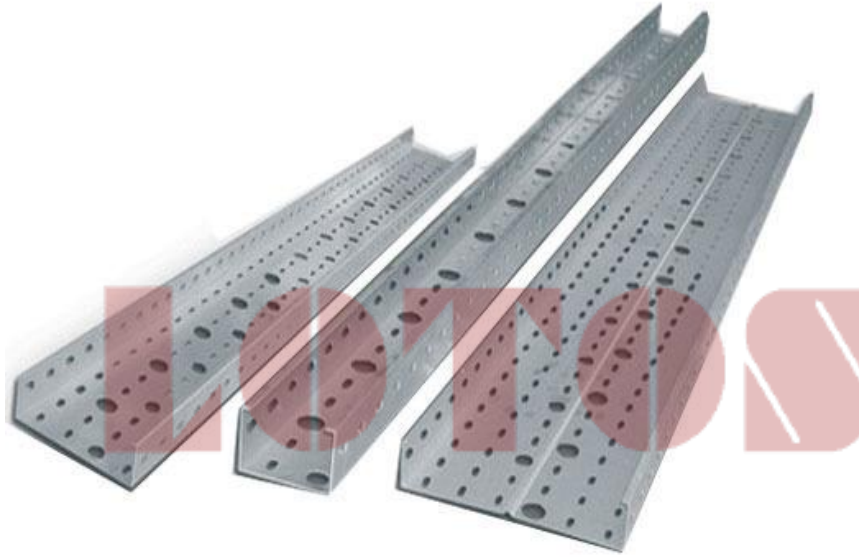
5. Wire Mesh Cable Tray:

- 5. Wire Mesh Cable Tray:
- A job site, field adaptable support system primarily for low voltage, telecommunication, and fiber optic cables. These systems are typically steel wire mesh, zinc plated.

- standard widths of 25, 50, 150, 200, 300, 400, 450, 500, and 600 millimeters

- standard depths of 25, 50, and 100 millimeters

- the standard length of about 3 meter Wire Mesh tray is generally used for telecommunication and fiber optic applications and are installed on short support spans, 1.2 to 2.4.

5. Wire Mesh Cable Tray:
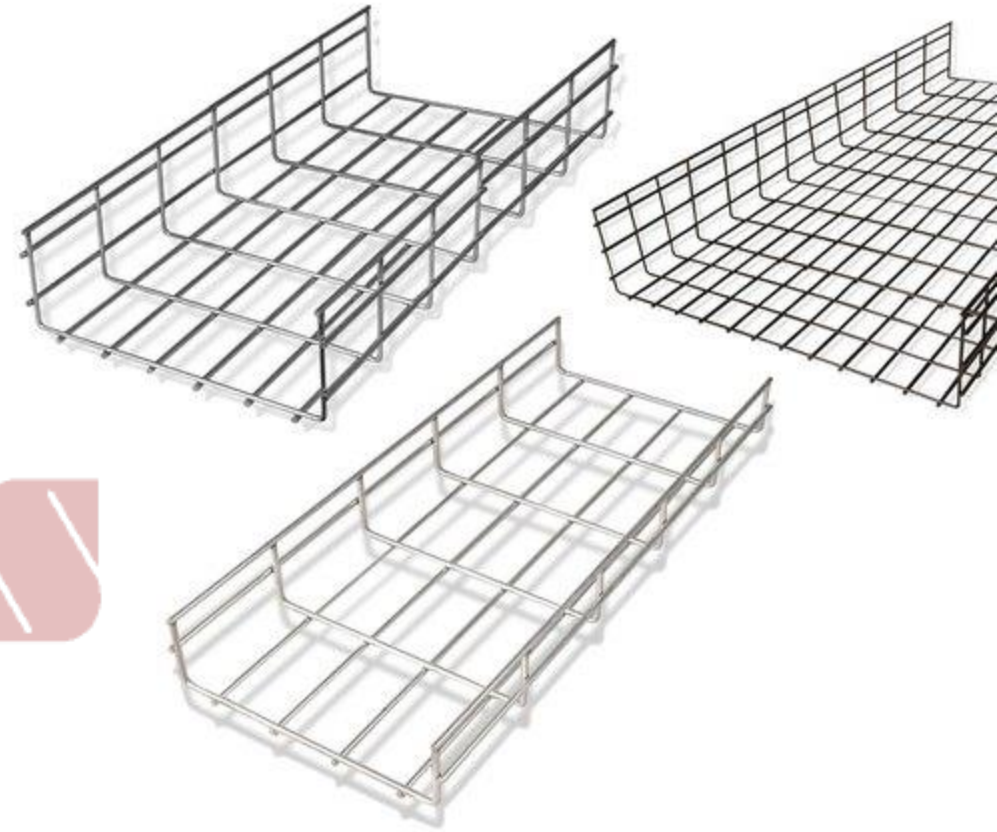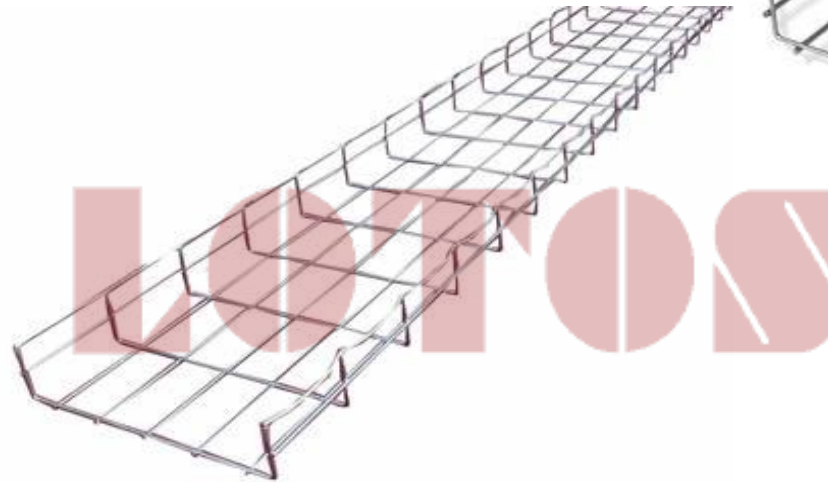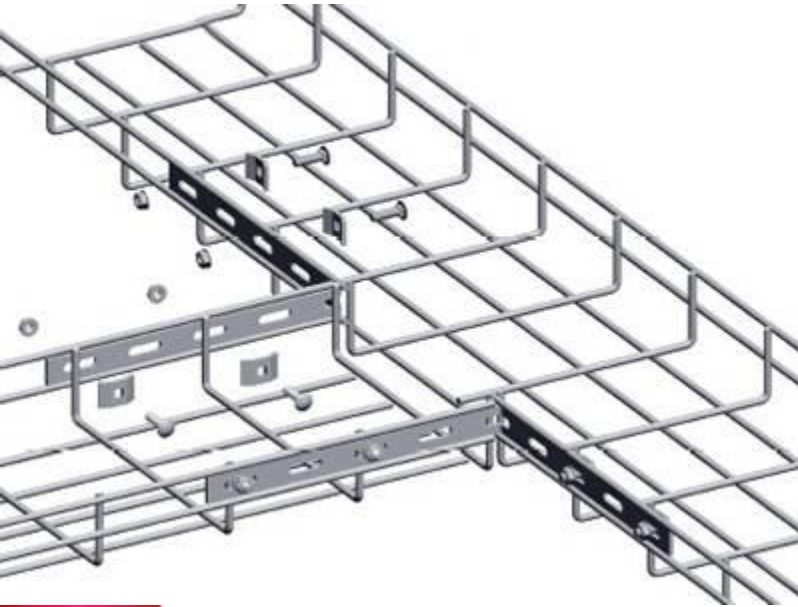
6. Single Rail Cable Tray:

aluminum systems are the fastest systems to install and provide the maximum freedom fort cable to enter and exit the system.

• Single-hung or wall-mounted systems in single or multiple tiers. Standard widths are 6, 9, 12, 18, and 24 inches.

• Standard depths are 3, 4, and 6 inches.

• Standard lengths are 10 and 12 feet. Single Rail Cable Tray is generally used for low voltage and power cables

6. Single Rail Cable Tray:
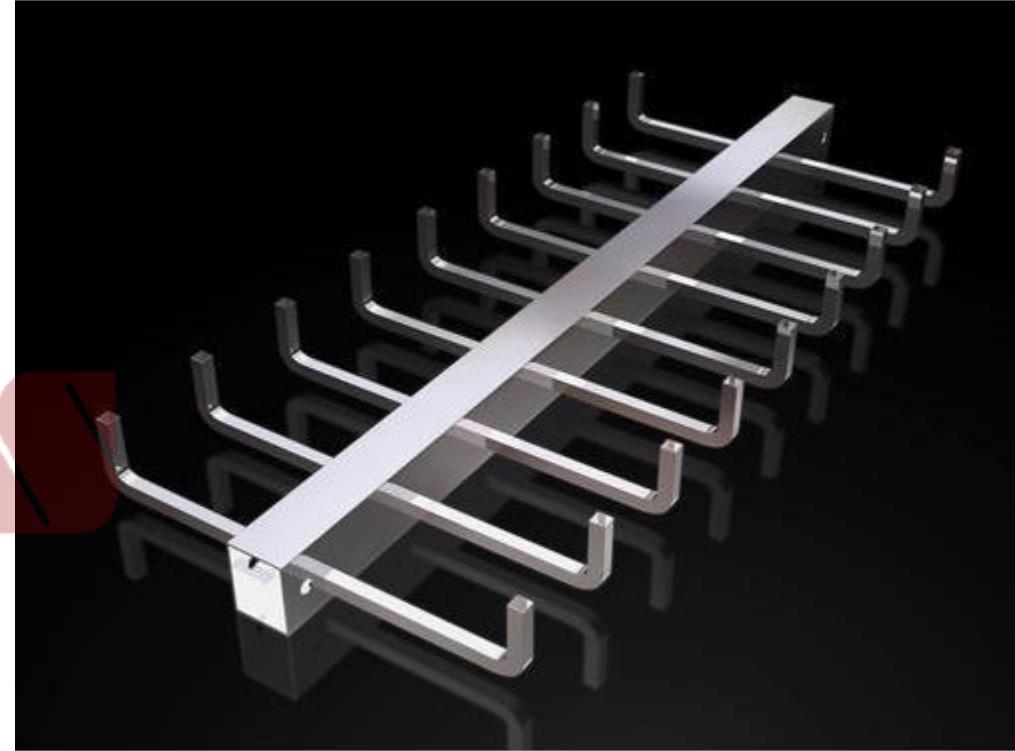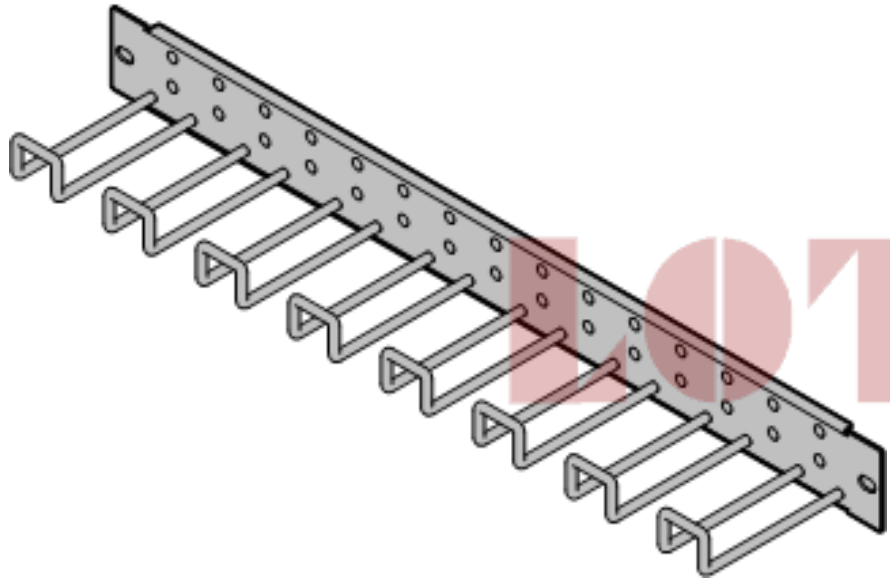
Cable Tray Installation Step

- Common Tools for Cable Tray installation
- Marking of Cable Tray
- Cutting & Fabrication of Cable Tray
- Drilling of Cable Tray
- Support Installation for Cable Tray
- Cable Tray Fitting & Accessories
- Fixing of Cable Tray

Common Tools for Installation :

The following tools are commonly used for the installation of cable tray:

1. Metal cutting saw 2. Touch-up material 3. Screwdriver 3. Drill with bits 4. File 5.Open-end wrench 6. Nylon cord or laser 7. Sealant for cut edges(fiberglass) 8. Cutting saw (for fiberglass), carbide- or diamond-tipped 9. Leveling device 10. Tape measure 11. Square 12. C clamp 13. Torque wrench 14. Ratchet wrench 15 Offset bolt cutters (wire mesh) 16 Dust mask (fiberglass) 17 Appropriate safety equipment.

Marking of Cable Tray

Using a square that reaches across the width of the cable tray, gauge off the edge of one side rail and mark both flanges. Mark the web of the rail. Marking can be done with a scribe, marking pen, or a pencil.
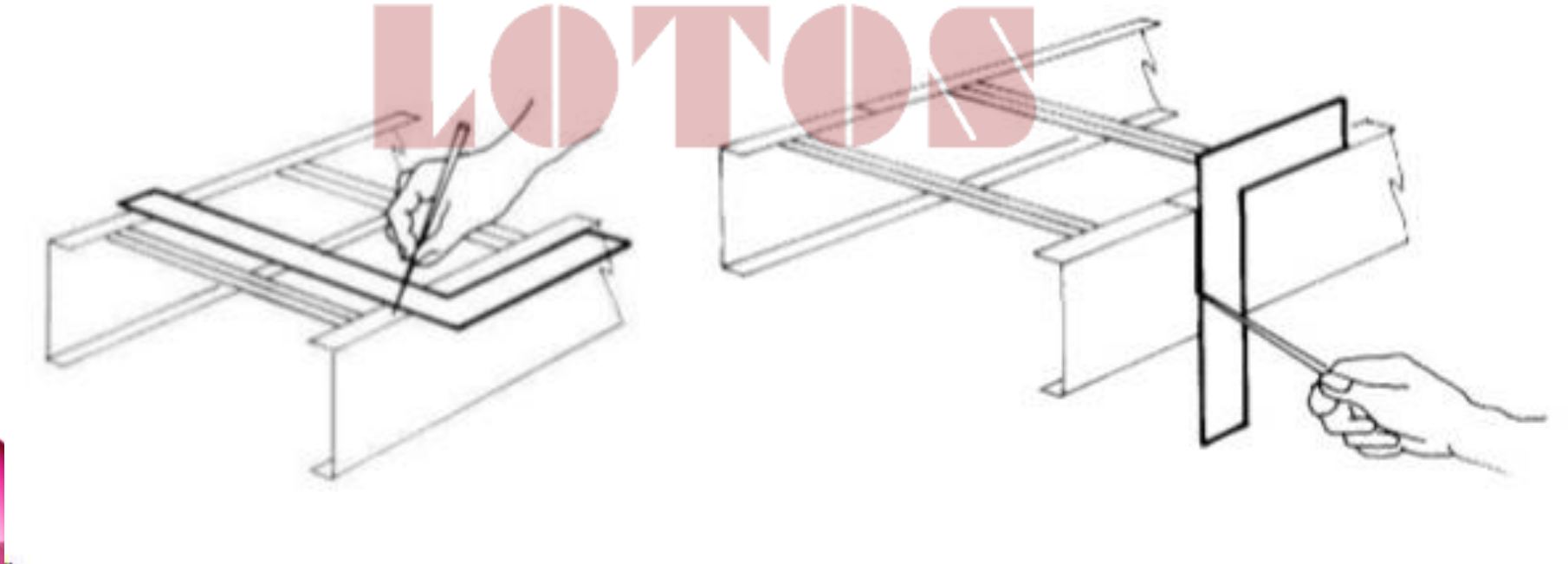
Cutting & Fabrication of Cable Tray

The cutting can be made using a hand-held hack saw, a circular saw with carbide-tip or diamond-dusted blade, a hand-held band saw, offset bolt cutters, or a high-speed grinder (for wire mesh only). It is important to get a square cut to ensure a good splice connection.

Cable tray manufacturers offer jigs and other devices to aid in the field cutting. After cutting, smooth the cut edges to remove any burrs. Fiberglass material should be cut with a circular saw with a carbide tip or a diamond-dusted blade.

examples of Cable Tray Cutting
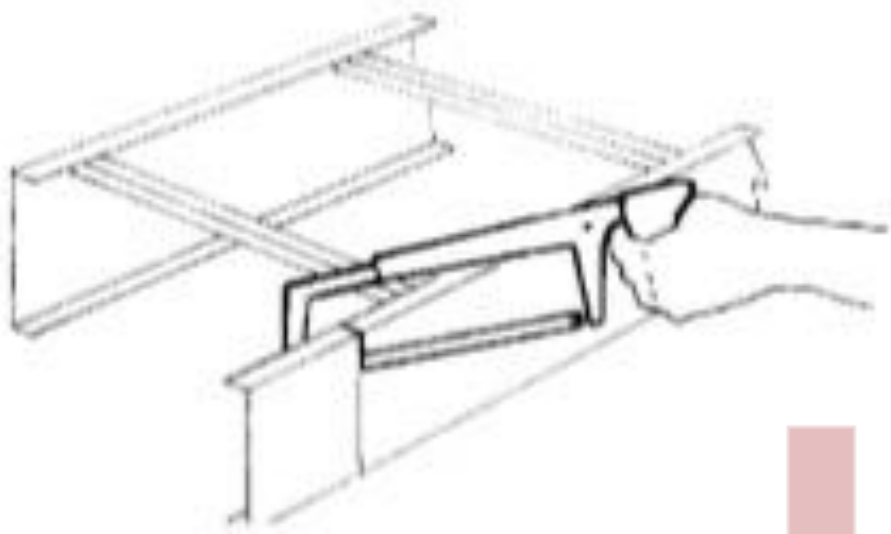
Cutting with Hand-Held Hack Saw

Cutting with Bolt Cutters

Drilling:

Holes for splice plates must be drilled in field-cut cable trays. The most common method of locating the hole positions is to use a splice plate as a template. Drill jigs are also available. A short piece of side rail that is punched with the standard factory hole pattern can be bolted to the splice plate to serve as a stop that rests against the end of the field-cut side rail Clamp the splice plate to the rail and drill through the splice plate holes and the side rail. The correct drill size depends on the hardware supplied with the cable tray. Match the holes that exist in the cable tray. After drilling, remove burrs.

Cable Tray Supports :

1. Trapeze Support (Single or Multi-tier)

2. Hanger rod clamps, "J" hangers

3. Center Hung Support

4. Wall Support

5. Underfloor Support

6. Single Channel Cable Tray Hanger

7. Double Channel Cable Tray Hanger

1. Trapeze Type

- Thread nuts onto threaded rod approximately 50 mm (2 in) above the desired location for the bottom of the cable tray.

- Slide on square washers followed by the cross member and the second set of square washers.

- Thread the second set of nuts onto the threaded rod.

- Move the cross member so that the top surface is located where the bottom of the cable tray run will be located.

- Move the second set of nuts up the threaded rod until the cross member is reached and held in place.

examples of Trapeze Type Supports
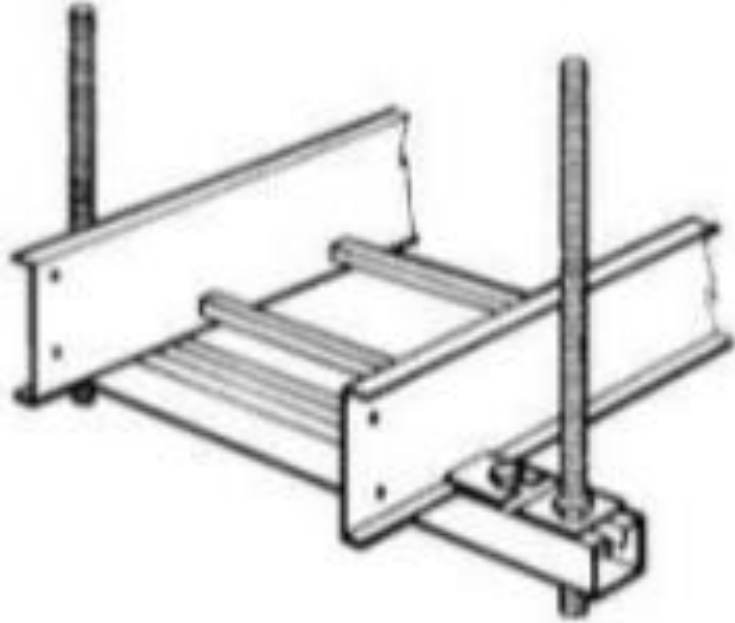
Figure 1.3 C-Channel Support

Figure 1-1 Strut Support

Threaded Rod (2)

Hex Head Cap Screw (2)

Cable Tray Hold-down Clamp (2)

Strut Nut (2)

Square Washer (4)

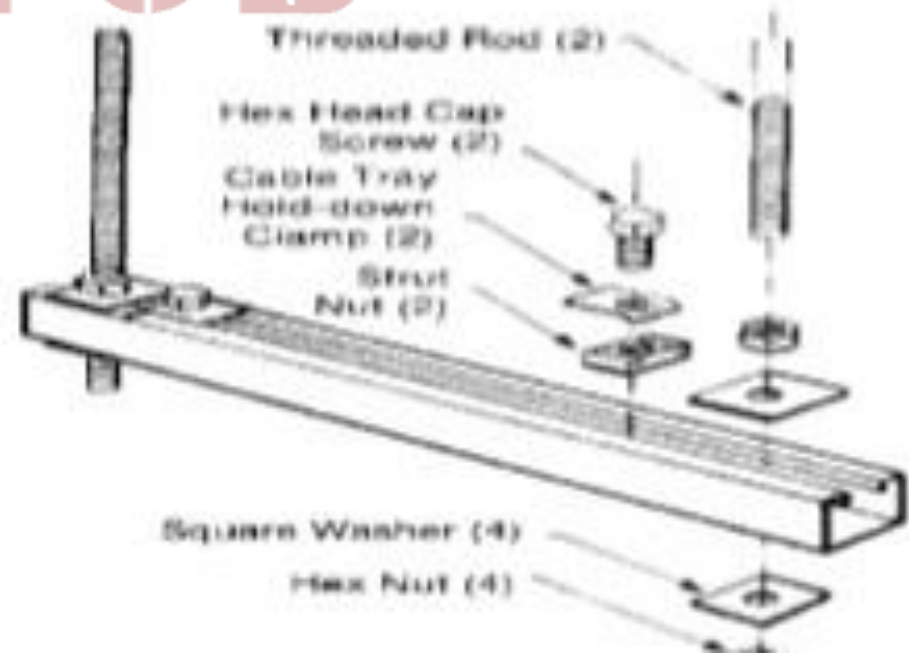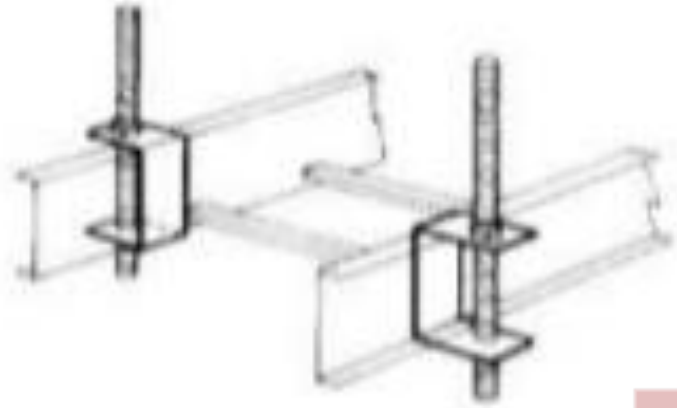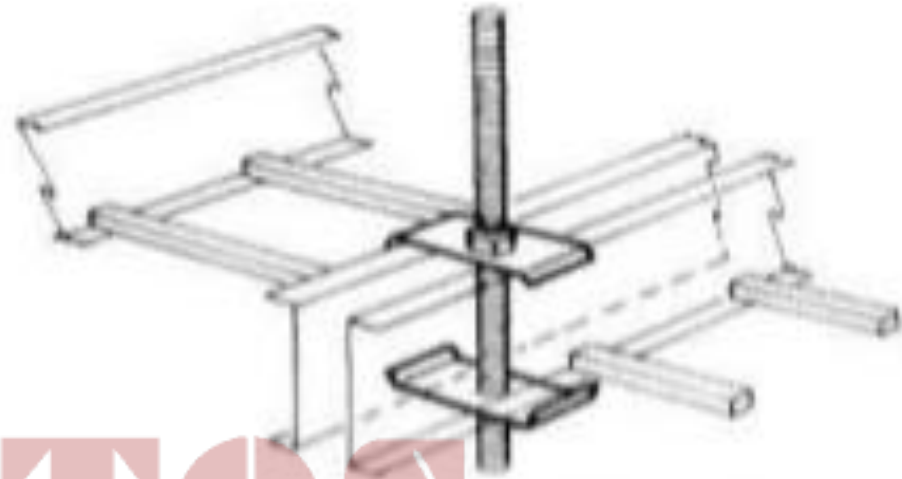Hex Nut (4)

2. Hanger Rod Clamp

• Thread nuts onto threaded rod approximately 225 mm (9 in) above the desired location for the bottom of the cable tray.

• Place a clamp around the side rail of the cable tray.

• Lift the entire cable tray section onto the threaded rod, running the threaded rod through the holes in the clamps.

• Thread the second set of nuts onto the threaded rod, moving them up until the bottom of the cable tray reaches the desired location.

• Move the first set of nuts down the threaded rod and secure clamps in place.

examples of Hanger Rod Clamp Supports

2.1. Single Cable Tray Hanger

2.3. Double Cable Tray Hanger

3. Center Hung Support

- Thread the nut onto threaded rod approximately 225 mm (9 in) above the desired location for the bottom of the cable tray.

- Slide washer and support onto the threaded rod with an upright tube going through the center of the cable tray section needing support.

- Place a square washer on the threaded rod and thread on the second nut.

- Move cross member so its top surface is located at the place where the bottom

- the cable tray run will be located.

- Move the second nut up the threaded rod until it reaches the cross member and holds it in place.

- Move the first nut down the threaded rod until it secures the cross member in place. In most cases, hold-down/guide clamps may be mounted on either the inside or outside of the cable tray. When installed on the inside of the cable tray, the clamp and/or attaching hardware should not extend into the cable pathway.
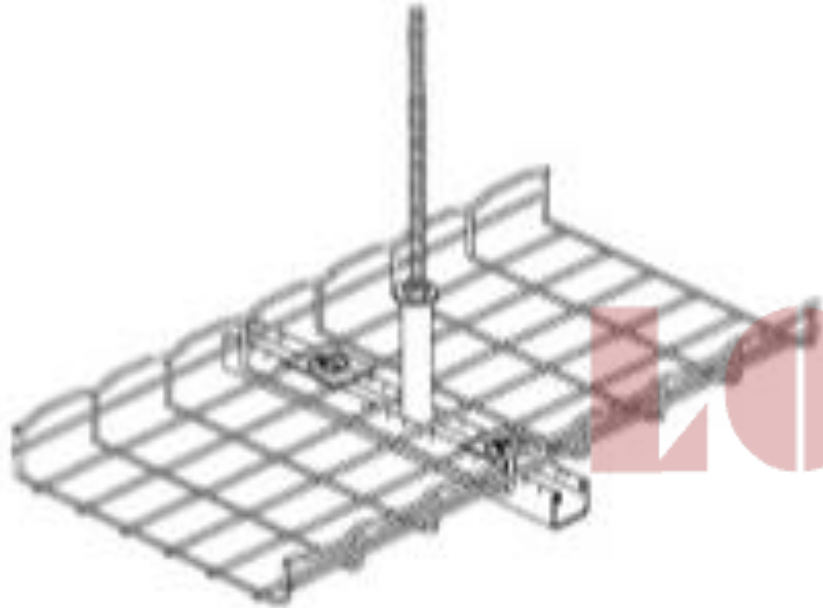
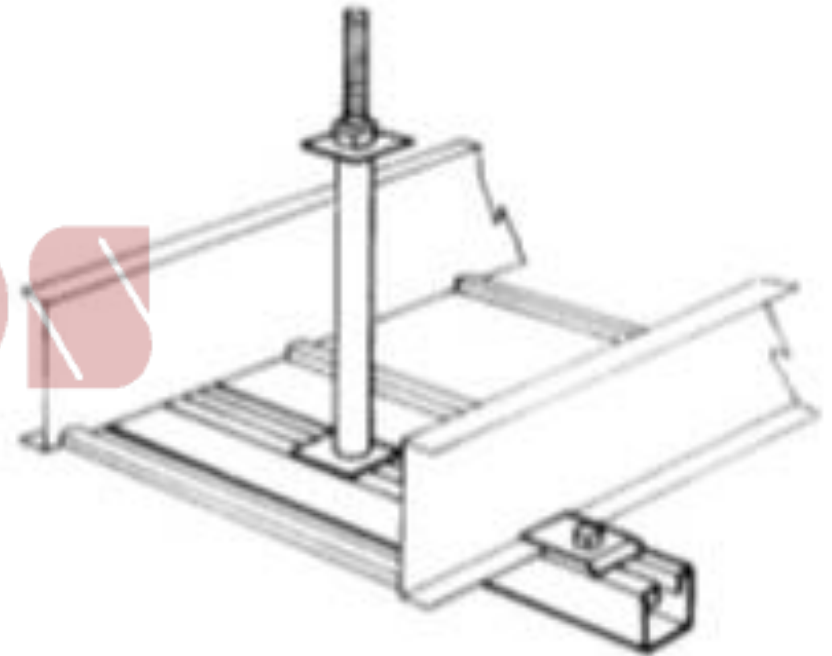# Exemple of 3.1 Center Hangar Support

Figure 3.1 Center Hangar Support

Figure 3.2 Center Hangar Support

4. Wall and Cantilever Brackets

Secure the brackets to the structure or wall making sure they are level and align.
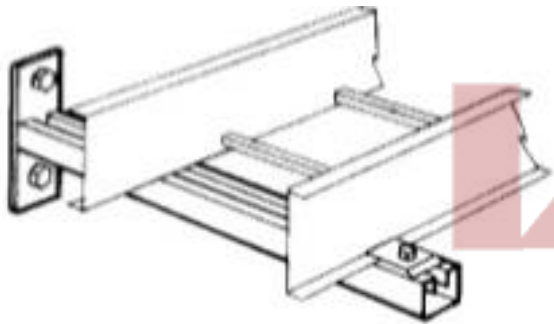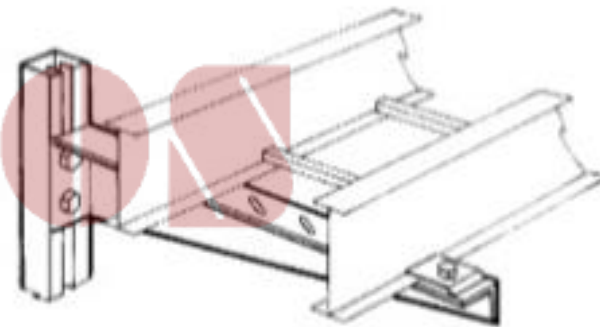
Figure 4-1 Single Strut Cantilever Bracket
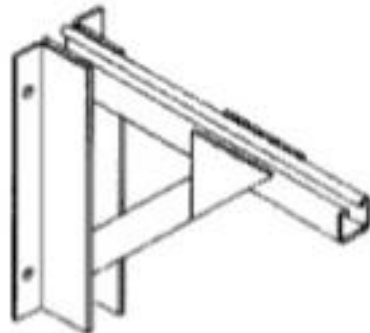
Figure 4-2 Gusset Cantilever Bracket

Figure 4-3 Fiberglass Cantilever Bracket
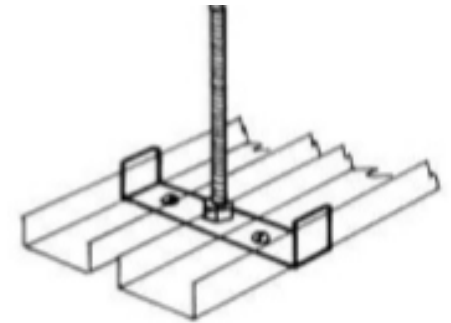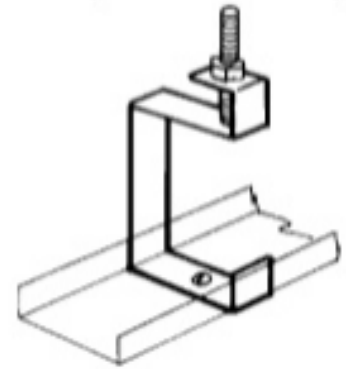
Figure 4-4 Single-Rail Direct Wall Mount

5. Floor and Roof Installations

- Cable tray should not be laid directly on the floor or roof.

- It should be mounted far enough off the floor or roof to allow the cables to exit through the bottom of the cable tray.

- If a strut is used for this purpose, mount the strut directly to the floor or roof and attach the cable tray to the strut using hold-down clamps and/or guide clamps.
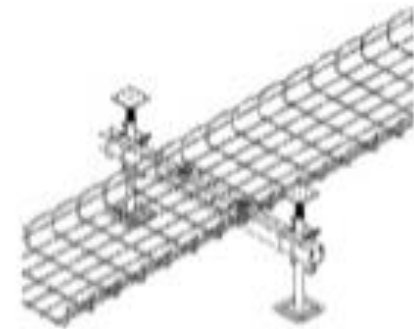
6. Single & Double Channel Cable Tray Hanger

- Thread the nut onto the threaded rod to the height required.

- Place the hanger on the threaded rod and follow with one nut.

- Run nut up the threaded rod until the bottom of the hanger is at the desired height

- Run top nut down to tighten.

- Place channel on the hanger, and secure in place as necessary.

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