

Section 2

Safety, Tools and Equipment, Shop Practices

Unit 6: Fasteners

Unit Objectives

After studying this chapter, you should be able to:

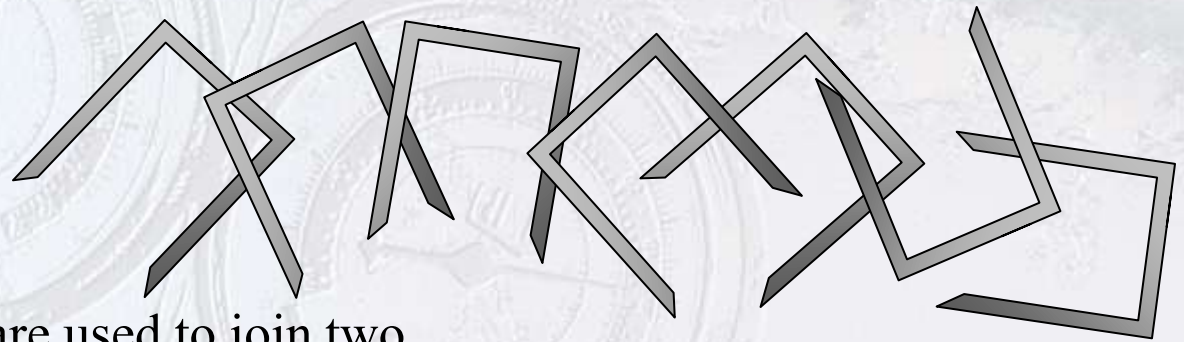
- Identify common fasteners used with wood.
- Identify common fasteners used with sheet metal.
- Write and explain a typical tapping screw dimension.
- Identify typical machine screw heads.
- Write and explain each part of a machine screw thread dimension.
- Describe a fastener used in masonry.
- Describe hanging devices for piping, tubing, and duct.
- Describe solderless terminals and screw-on wire connectors.

NAILS

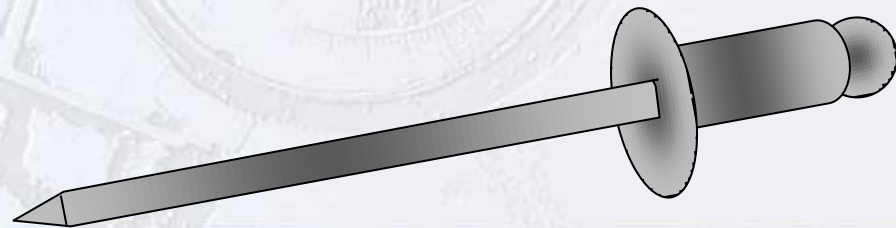
- The most popular fastener for securing wood
- Different styles and types for different uses
 - Common nails
 - Masonry nails
 - Finishing nails
 - Roofing nails
- Nails are sized by the term “penny”

STAPLES AND RIVETS

- Staples are available in a number of sizes for different applications, such as fastening wire in place



- Rivets (pin or blind) are used to join two pieces of sheet metal.



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USING THE BLIND OR PIN RIVET TO JOIN SHEET METAL

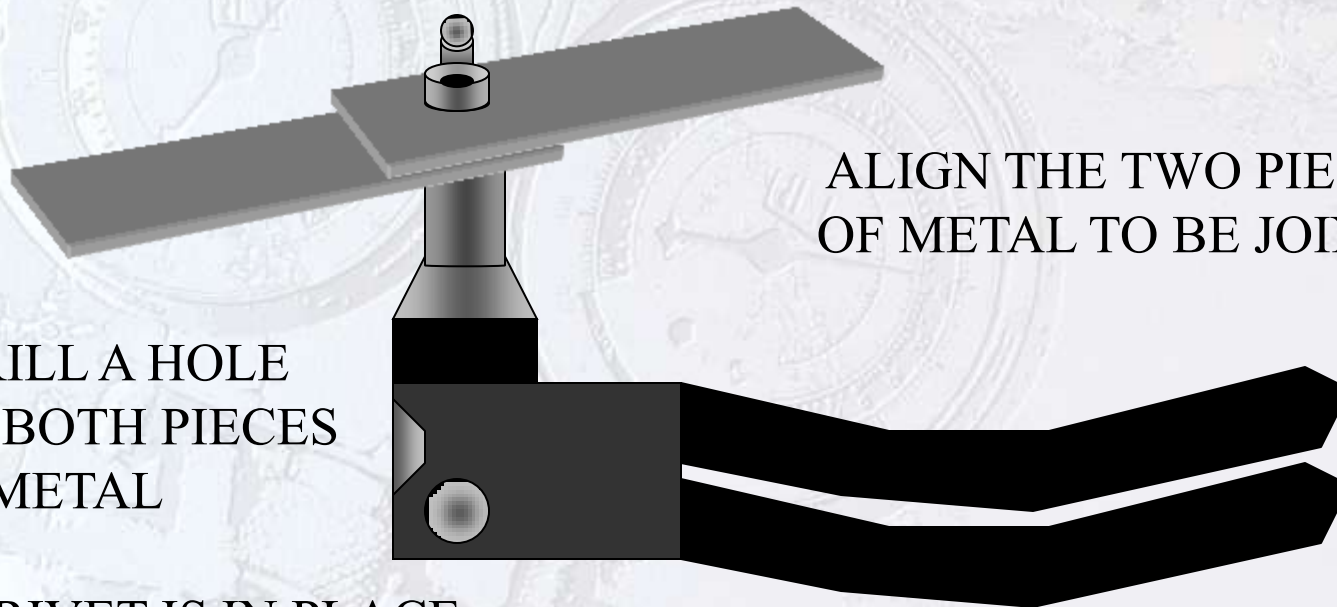
INSERT THE RIVET
THROUGH THE HOLE

THEN... SECURE THE RIVET WITH A
RIVET GUN...

THEN DRILL A HOLE
THROUGH BOTH PIECES
OF METAL

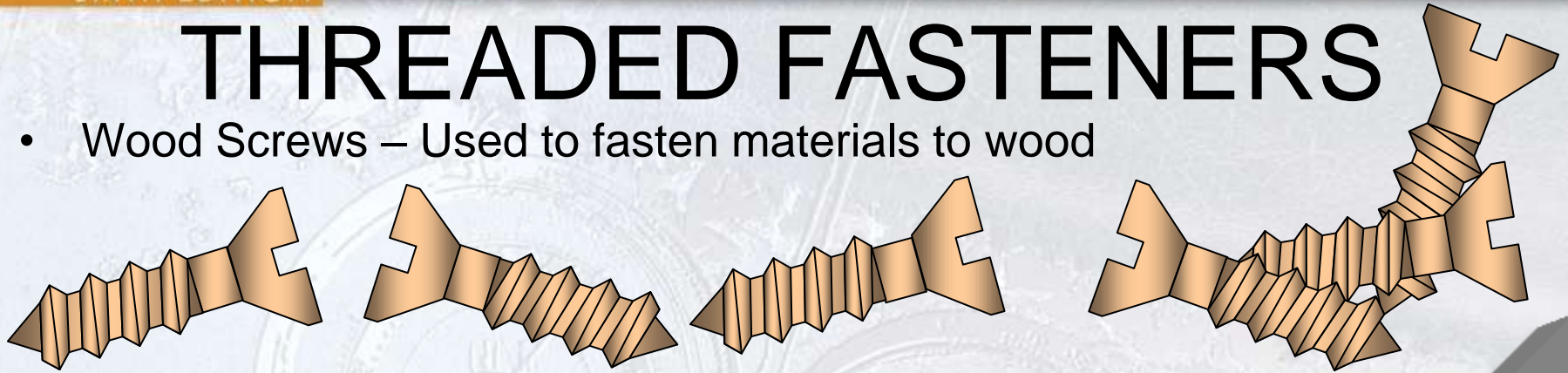
ALIGN THE TWO PIECES
OF METAL TO BE JOINED

...AND THE RIVET IS IN PLACE

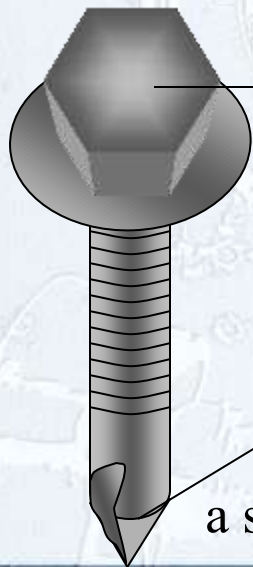


THREADED FASTENERS

- Wood Screws – Used to fasten materials to wood



- Self-tapping Screws – Used to secure sheet metal



Manufactured with hex heads...

...and drill tips...

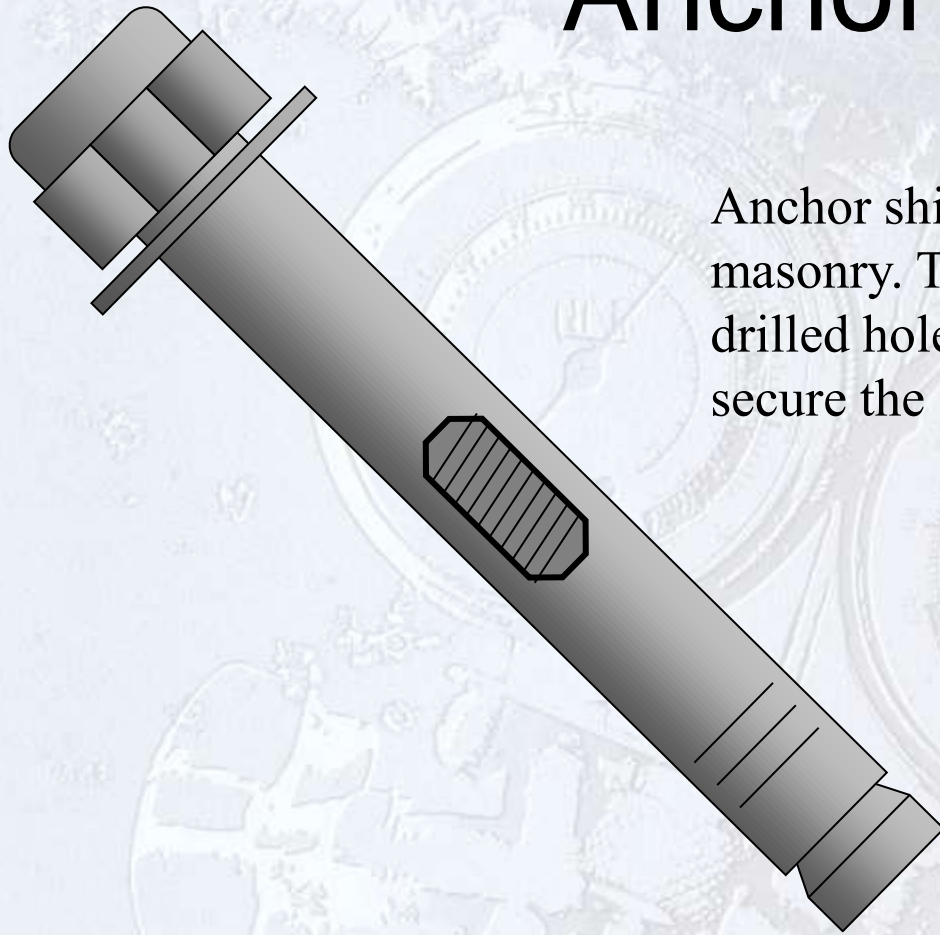
... and installed using
a special chuck that mounts in a drill



Other Screw Types

- Machine Screws or Bolts
 - Used in conjunction with nuts, which thread onto the screw
 - Manufactured with different head shapes including round and hex
- Set Screws
 - Can have different heads
 - Typically used to secure pulleys to motor or blower shafts

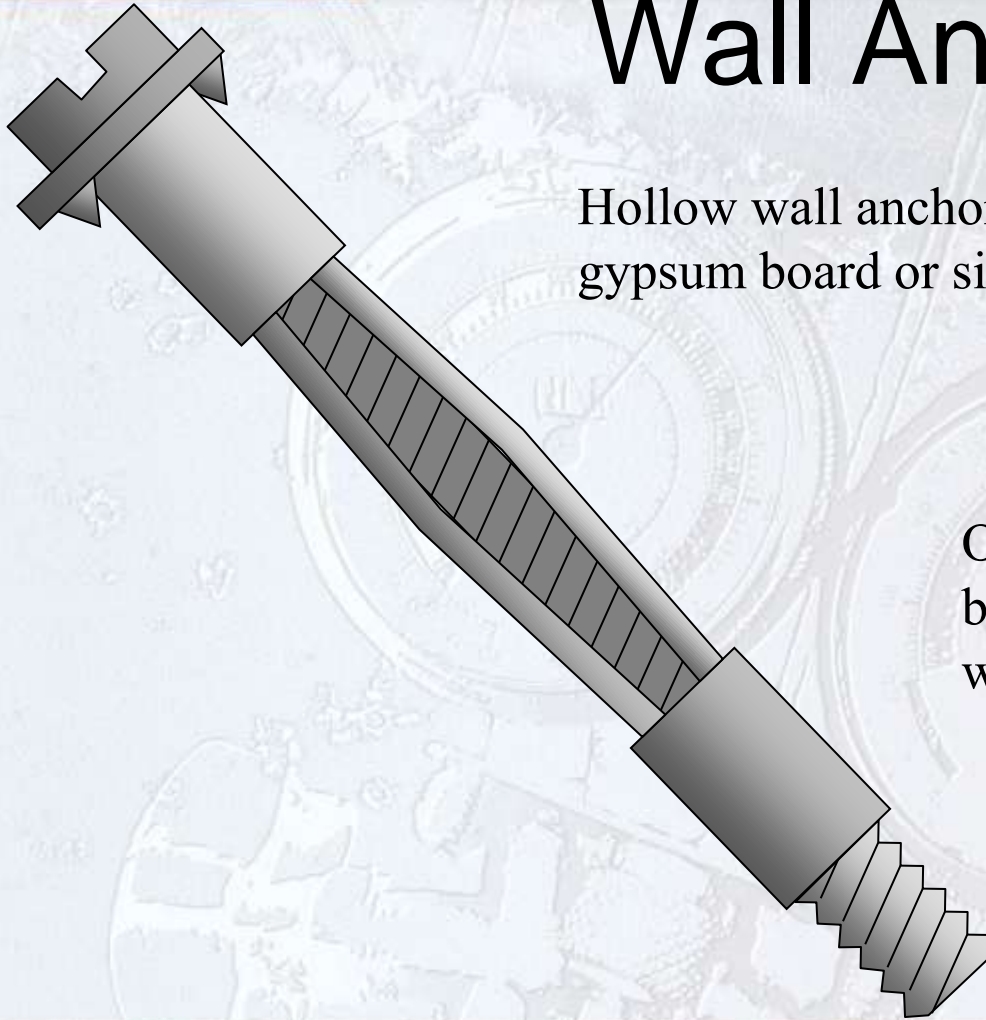
Anchor Shields



Anchor shields are often used to fasten objects to masonry. The shield is first inserted into a pre-drilled hole and then the bolt head is tightened to secure the shield.

Wall Anchors

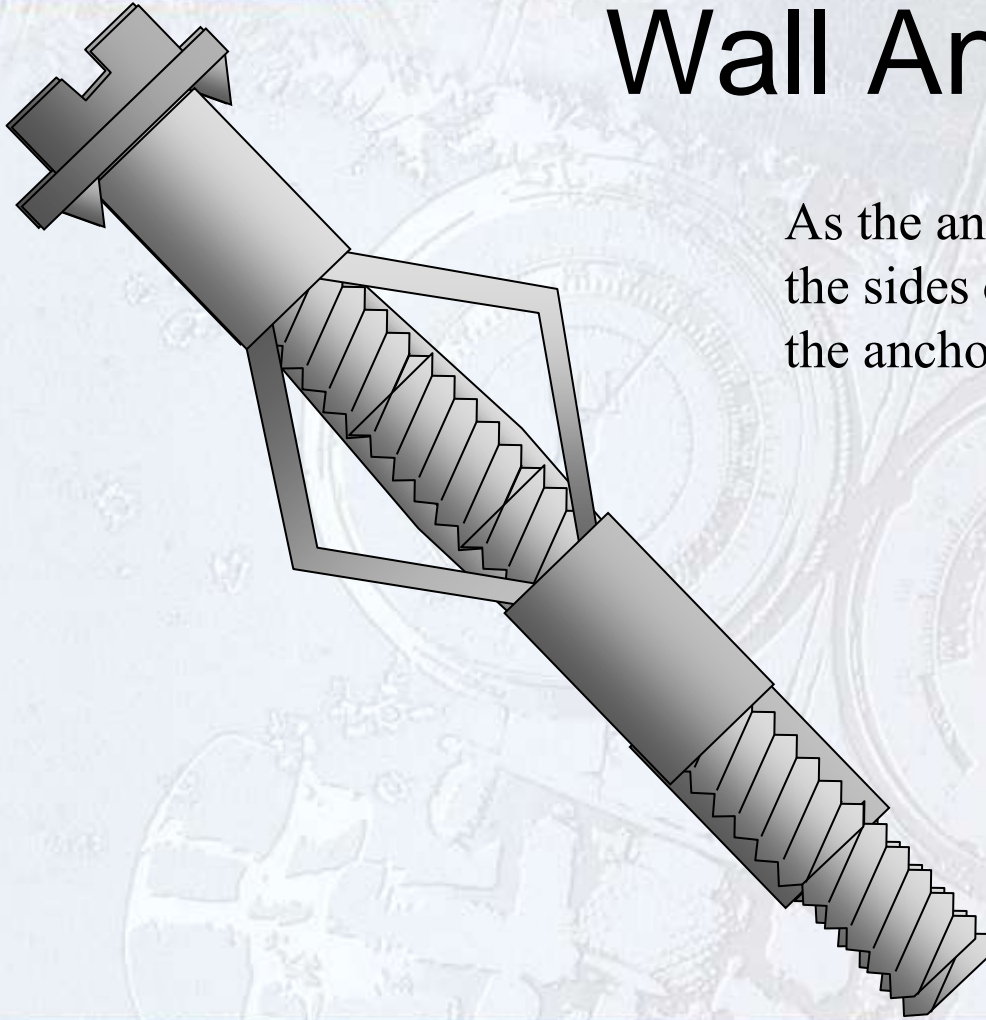
Hollow wall anchors can be used in plaster, sheetrock, gypsum board or similar material



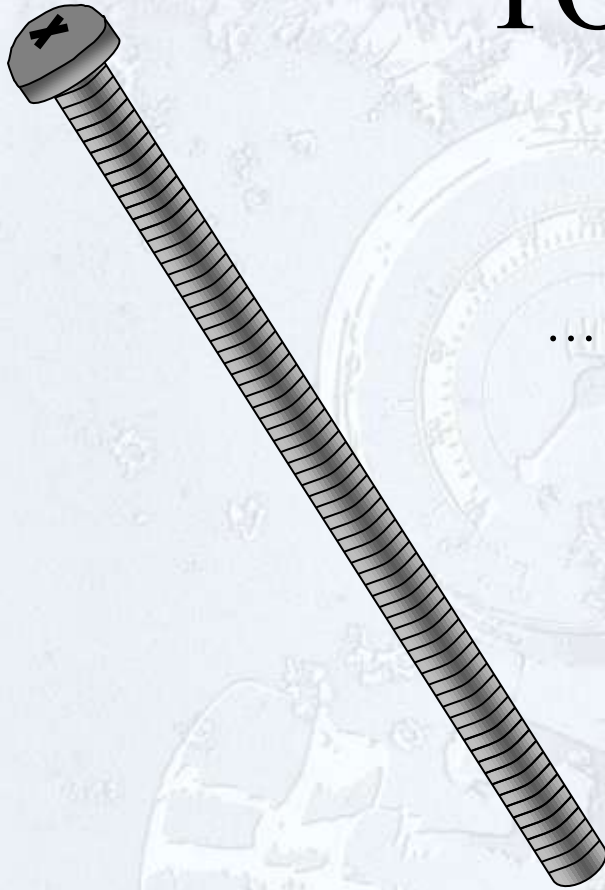
Once the anchor is set, the screw can be removed as often as needed without affecting the anchor

Wall Anchors

As the anchor screw is tightened in the wall, the sides of the wall anchor expand, securing the anchor in the wall

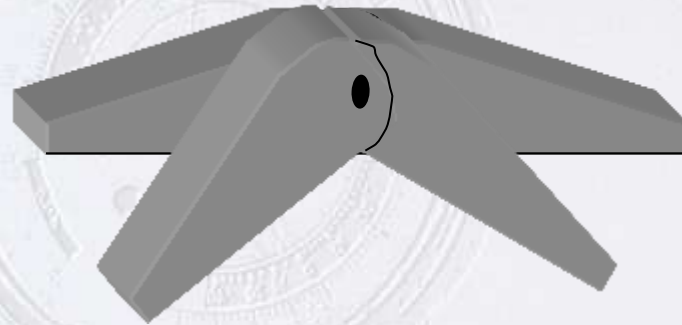


TOGGLE BOLTS



Use a bolt...

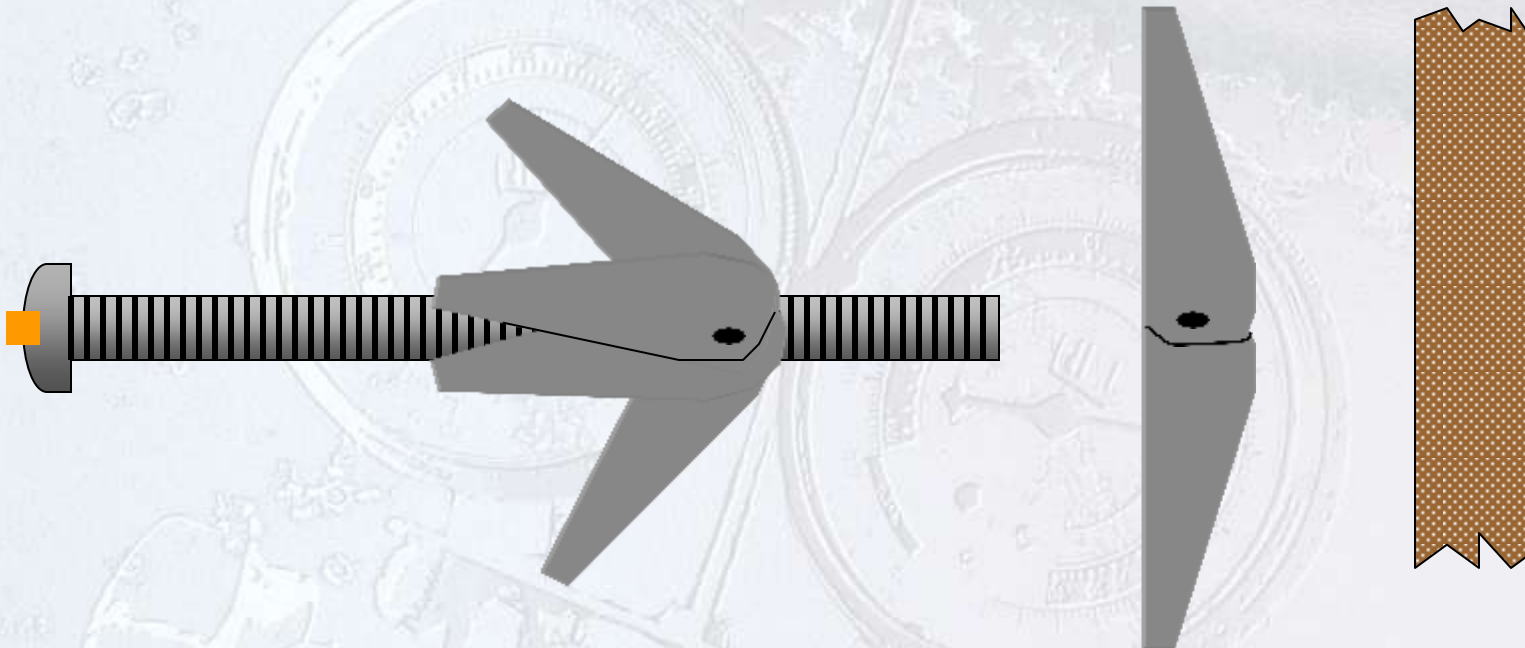
... and a spring-loaded, folding toggle



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THE BOLT IS THREADED INTO THE TOGGLE
TOGGLE IS THEN FOLDED TOWARD THE BOLT

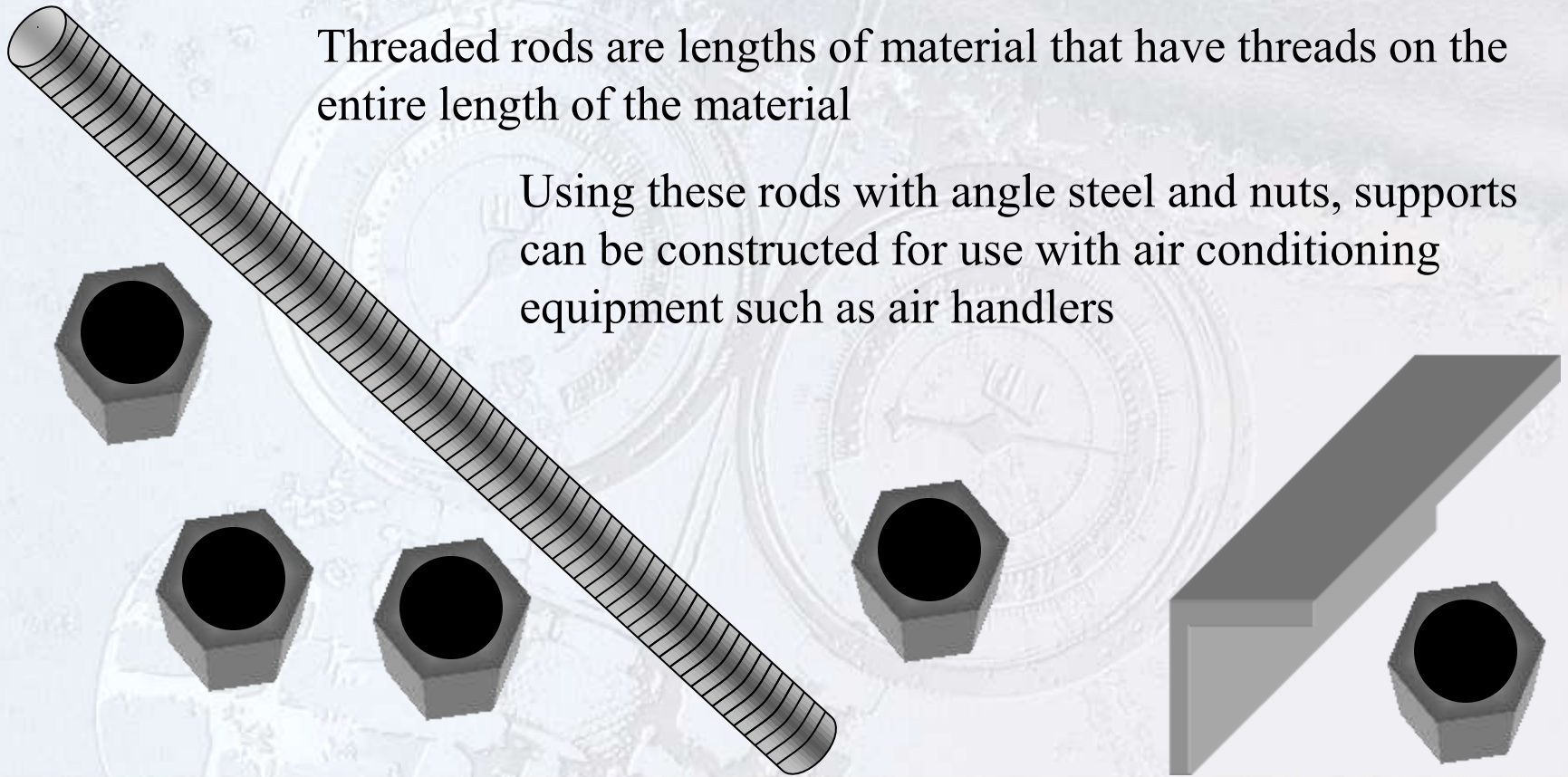


THE FOLDED TOGGLE IS INSERTED INTO THE WALL
TIGHTENING THE BOLT PULLS THE TOGGLE AGAINST THE WALL

THREADED ROD AND ANGLE STEEL

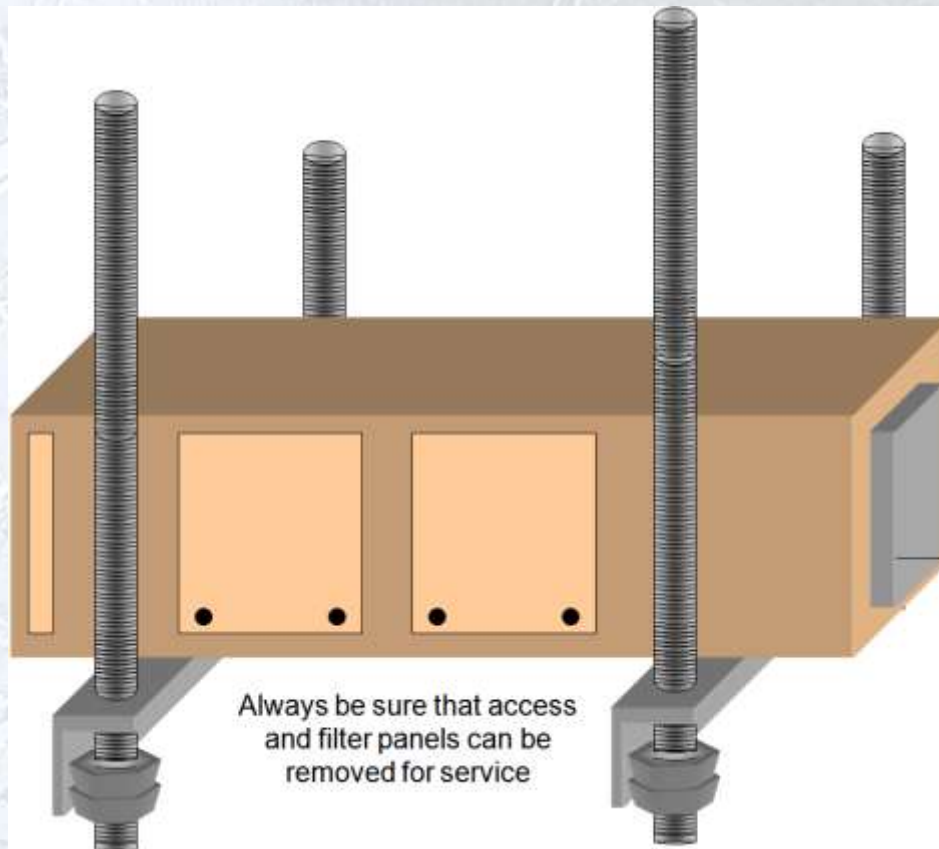
Threaded rods are lengths of material that have threads on the entire length of the material

Using these rods with angle steel and nuts, supports can be constructed for use with air conditioning equipment such as air handlers



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Other Fasteners...

- Cotter pins – Used to secure pins
- Pipe hooks – Wire bent to form a “U” to support pipes
- Pipe straps – Material used to mount pipes to a surface
- Perforated strap – Strapping material with spaced holes
- Nylon straps – Commonly used to secure flexible duct to sheet metal collars
- Grille clips – Used to mount supply registers and grilles
- Concrete fasteners – Used to secure materials to concrete

Unit Summary

- Many fasteners are used in the HVAC industry
- Include nails, screws, staples, anchors and shields
- Wire hooks, pipe straps, perforated straps and threaded rod can be used to mount piping materials, duct sections and pieces of air conditioning equipment
- Nylon straps can be used to secure flexible duct to sheet metal collars