

INSTALLING AND SETTING
SELF-DRILLING ANCHORS

CONTENTS

1.	GENERAL	4.2	Self-Drilling Anchors
1.1	Scope	4.3	Drilling and Setting Techniques
2.	INSTALLING EQUIPMENT	4.4	Determine Properly Set Anchors
3.	DRILLING HOLES IN MASONRY	5.	MISCELLANEOUS INFORMATION
3.1	General	5.1	Hoisting
3.2	Depth and Diameter of Holes	5.2	Load Capacity
4.	SETTING SELF-DRILLING ANCHORS	6.	VERIFICATION ITEMS
4.1	Types and Sizes		

1.	<u>GENERAL</u>	2.2	<u>Wall and Column Drilling</u>
1.1	<u>Scope</u>	2.21	The R-4416 Roto-Stop Hammer is to be used for drilling in columns and walls.
1.11	This section covers the specific requirements and installation procedures for installing self-drilling anchors in masonry with the Electric Roto-Stop Hammer R-4416.	2.3	<u>Ceiling Drilling</u>
2.	<u>INSTALLING EQUIPMENT</u>	2.31	The R-4416 Roto-Stop Hammer is to be used for drilling in reinforced concrete.
2.1	<u>Floor Drilling</u>	2.32	Do not use the R-4416 Roto-Stop Hammer to drill hollow tile since the hammer tends to crack or shatter tile.
2.11	The R-4416 Roto-Stop Hammer contained in the 66A Kit will be provided for job requiring holes in floors, columns, walls, or ceiling. Operating instructions for the R-4416 Roto-Stop Hammer are contained inside the Kit 66A Case.	2.4	<u>Kits</u>
			No. 33 Vacuum Cleaner Kit No. 66A Roto-Stop Hammer Kit
	<u>CAUTION: DO NOT ATTEMPT TO DRILL THROUGH REINFORCING RODS WITH THE R-4416 ROTO-STOP HAMMER. THE PRESENCE OF REINFORCING ROD CAN BE DETECTED BY BINDING OF THE DRILL AND AN ACCOMPANYING SQUEALING NOISE. WHEN RODS ARE ENCOUNTERED, MOVE THE LOCATION OF THE HOLE THE NECESSARY DISTANCE TO MISS THE ROD.</u>	2.41	<u>Additional Tools</u> R-3055 Goggles, Safety All Plastic
		2.42	Smaller jobs not provided with Masonry Drillings Kit 66A shall use the 76A Kit equipped to drill with self-drill anchors.
2.12	Where self-drill anchors cannot be installed due to building construction obtain OTC approval to masonry carbide bits and drop-in anchors.	3.	<u>DRILLING HOLES IN MASONRY</u>
		3.1	<u>General</u>

CAUTION: WEAR R-3055 ALL PLASTIC SAFETY GOGGLES WHEN DRILLING HOLES IN MASONRY. WHEN DRILLING IN LOCATIONS SUCH AS CEILINGS OR WALLS ABOVE EYE LEVEL, COVER VENTILATING HOLES IN THE FRAME OF THE GOGGLES TEMPORARILY WITH SCOTCH TAPE.

3.11 Prevent spreading of dust by using a vacuum cleaner. Play the hose around the hole being drilled and remove dust from completed hole with the 1/2" rubber tube attachment in Vacuum Cleaner Kit (see Note). When a cleaner is not available, a wet sponge or rag may be used to collect dust.

NOTE: The R-2927 Vacuum Cleaner attachment, included in Kit 33, which connects to the R-1085 1/2" Rubber Tube will be found helpful in picking up dust from the bottom of a hole.

3.111 When the R-2826 Vacuum Cleaner is being used for picking up cement or concrete dust in connection with masonry drilling operations, the filter cones must be frequently replaced to prevent overheating and a subsequent burnout of the motor since the cement dust tends to clog the filter, preventing proper ventilation of the parts.

3.12 Before drilling floors or walls below the ground level, consult the Telephone Company as to the probability of drilling into the waterproofing, as authorized in Section -20B2 of Handbook 30, and as to the procedure to be followed if the waterproofing is punctured.

3.121 In other than Telephone Company buildings, particularly on PBX installations in privately owned buildings, the Telephone Company should also be consulted as to the location of gas, water, etc., pipes and conduits containing electrical circuits to eliminate possible accident hazard and equipment damage.

3.13 When holes are to be drilled in walls or partitions, tape a small cardboard box just below the hole to prevent any plaster or cement dust from falling on the floor or in equipment.

3.14 When drilling holes in linoleum covered concrete floors, drill before removing the linoleum. With this procedure, the center of the hole is more easily marked and a more accurately located and dimensioned hole will result.

3.15 When self-drilling anchors are installed any length of time prior to the erection of the frames, the anchors should be protected from filling up with dust or dirt by means of masking tape or other suitable material.

3.16 When drilling ceilings, a dust shield used as shown in Figure 1 will prevent chips and dust from falling on adjacent equipment.

3.17 When the side handle on the R-4416 Roto-Stop Hammer is changed from its present position, the set screw must be retightened,

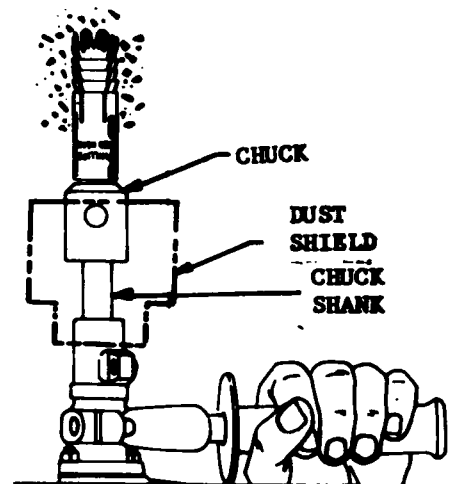


FIG. 1 METHOD OF CATCHING CHIPS WHEN DRILLING CEILINGS (PAR 3.16)

3.2 Depth and Diameter of Hole

3.21 Holes in masonry for anchors shall be of such depth as will permit the anchor without the cone part to be fully inserted in the hole.

3.22 Where plaster is over the surface, the hole shall be deep enough to permit the anchor to be installed approximately flush or underflush with the surface of the concrete (not the surface of the plaster).

4. SETTING SELF-DRILLING ANCHORS

4.1 Types and Sizes

4.11 The types and sizes of self-drilling anchors used shall be in accordance with information shown on drawings furnished the job or contained in the job Specifications.

4.12 The types and sizes of anchors normally furnished are shown in

Figure 2.

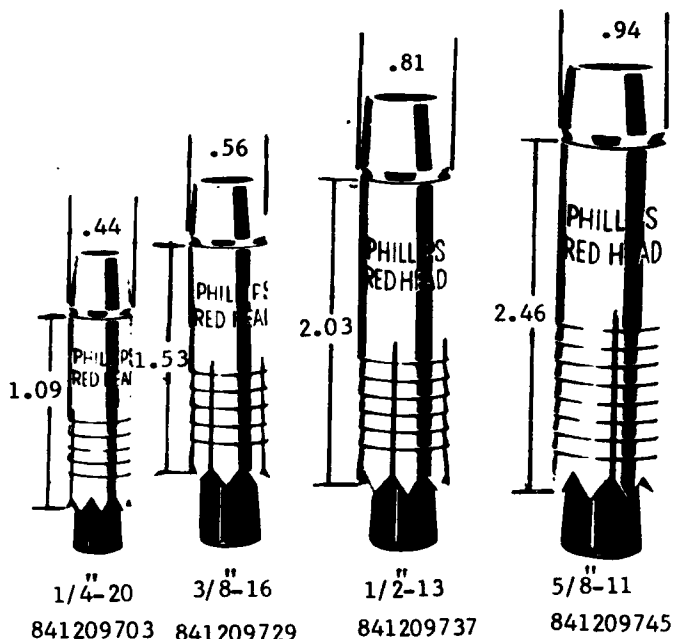


FIG. 2 TYPES OF SELF-DRILLING ANCHORS WHICH ARE SET WITH THE R-4416 TOOL (PAR 4.12)

4.13 Where drawings specify anchors other than those mentioned above and for which proper tools are not provided, the tools should be purchased locally. In such cases, a JIM listing the drawing on which the items are specified should be forwarded to the Engineer of Installation for record purposes.

4.2 Self-Drilling Anchors

4.21 Operator instructions for the installation of self-drilling anchors with the R-4416 Roto-Stop Hammer (Figure 3):

- 4.2101 Select the proper chuck head and seat it on the shank.
- 4.2102 Position and lock the chuck/shank assembly in the hammer.
- 4.2103 Insert and seat the anchor in the chuck.
- 4.2104 Operate the hammer without rotation to embed the teeth to position the anchor.
- 4.2105 Flip the Roto-Stop control level to engage rotation* and drill until the chuck is within 1/16" from the concrete.

***CAUTION:** ALWAYS HOLD THE AUXILIARY HANDLE WHEN ROTATION IS ENGAGED. LET THE TOOL DO THE WORK...APPLY ONLY ENOUGH PRESSURE TO CONTROL THE TOOL AND TO KEEP IT FROM CLIMBING ON THE SHANK.

4.2106 Stop the tool and lift up approximately 1" to disengage impact; then, start the tool withdrawing the anchor.

4.2107 Disengage rotation and holding the anchor start tool to expel the concrete cuttings.

4.2108 Clean the cuttings from the hole in the concrete.

4.2109 Insert and lightly seat the expansion plug in the anchor.

4.2110 Insert anchor in hole and set with the impact of the tool until the chuck is within 1/16" from the concrete.

NOTE: Larger sizes may require hand setting with flush-holder and 2-3 lb. hammer to obtain flush installation.

4.2111 Break off the chucking cone.

4.2112 Remove the cone from the chuck with the ejector key.

4.3 Drilling and Setting Techniques

4.31 The technique for drilling holes with self-drill anchors is different than using carbide bits. With the carbide bit, the more pressure that is exerted on the tool the faster the hole would be drilled. The secret of drilling holes with self-drill anchors is not to apply excessive pressure, i.e., lean on the tool, but simply let the weight of the tool do the work. Apply only enough pressure to control the tool.

4.312 All roto-stop hammers incorporate rotation and hammering action simultaneously. If excessive body pressure is applied on the roto-stop hammer, the hammering action of that tool is negated. The self-drill anchor teeth will have a tendency to burn or break. This phenomenon is often encountered in areas where concrete hardness is in excess of 4000 psi.

4.313 The self-drill anchor shall be used to drill one hole only.

4.32 Anchor Stuck in Floor

4.321 Self-drill anchors have a tendency to get stuck in the floor when the roto-stop hammer is in the upward movement, that is after the proper depth has been reached and the anchor is being pulled out.

4.322 There are two primary reasons why self-drill anchors get stuck:

- a) new chuck head causes slippage.
- b) the anchor was not in a perpendicular position to the floor when drilling started.

4.33 The stuck anchors can be removed as follows:

4.331 If the chuck head is new, moisten the tapered portion of the self-drill anchor and apply some of the concrete dust to that position. Place the roto-stop hammer on the anchor and follow procedures outlined in Paragraph 4.332.

4.332 Set the roto-stop hammer on the stuck anchor and continue drilling for a short period of time. Then stop the tool and lift it approximately 1/2". Holding the roto-stop hammer in the lifted position, restart the tool and continue lifting until the anchor is removed from the floor.

NOTE: When the roto-stop hammer is lifted approximately 1/2", the shank is not exposed to the hammering action.

4.333 If groove-joint pliers are available, grip the anchor and turn back and forth, at the same time apply a force in the upward direction.

4.34 Broken Anchors

4.341 If the anchor breaks and the broken part does not protrude above the floor line, take a new self-drill and drill in an alternate location as indicated below.

4.342 For ESS equipment the alternate self-drill anchor locations are indicated per ED-1A210-20 Note 3D and H-511-027 Note 9.

4.343 For bulb angle and sheet metal frames drill an alternate hole on the same centerline one inch toward the center of the frame.

4.344 If the broken self-drill anchor protrudes above the floor line, use groove-joint pliers to remove the broken part.

4.345 If the concrete is not damaged, use the same hole location for redrilling. However, if the surrounding concrete is chipped, redrill a new hole.

4.35 Hard Aggregate

4.351 When hard aggregate is encountered during the drilling operation, it is recommended that the roto-stop hammer be stopped, switched to hammering only and be operated for a short period of time. The hammering action of the tool will shatter the aggregate surface thus permitting the continuation of the drilling operations. The procedure might have to be repeated several times, depending on the aggregate.

4.4 Determining Properly Set Anchor

4.41 While the use of the R-4416 Tool will normally insure a properly expanded anchor, the results obtained when using other methods may not be as positive. If there is any question as to whether anchor has been properly expanded, particularly in walls and ceilings, test it as follows:

4.42 Place a bushing or several washers (with holes larger than the diameter of the shield or anchor) over the anchor and insert a screw or a bolt (or stud with nut attached), into the threaded nut.

4.43 Tighten the screw, nut or bolt with a suitable wrench or screwdriver. If the anchor can be easily withdrawn from the hole as the parts are tightened it has not been securely set and should be replaced. The location of the hole shall be moved the necessary distance to miss the hole and provide secure material for a new hole and a new anchor used for drilling the hole.

5. MISCELLANEOUS INFORMATION

5.1 Hoisting

5.11 Never hoist from a self-drill anchor. The only concrete inserts that should be used to hoist from, are the concrete cast-in-place type.

5.2 Load Capacity

5.21 The 500 lbs. maximum safe load capacity for 5/8" Loxins as outlined in Section 10 and 1A of Handbook 30 is applicable to 1/2" self-drilling anchors.

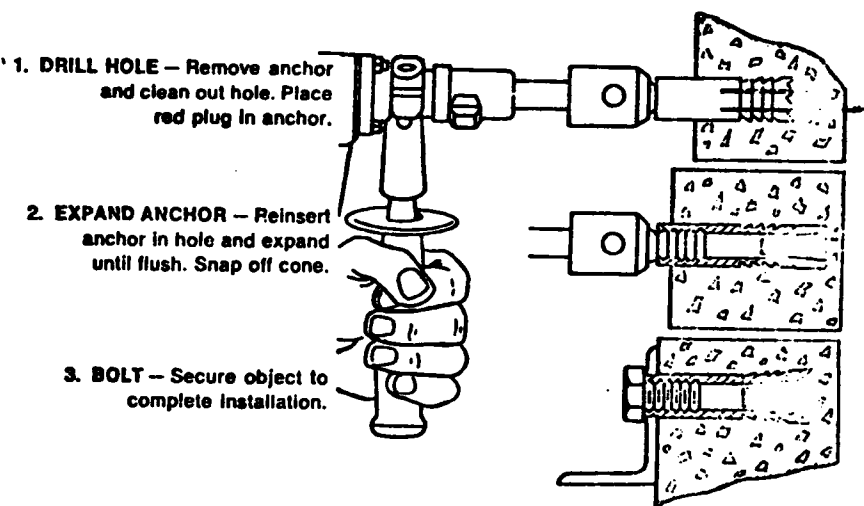


FIG. 3 INSTALLING SELF-DRILLING ANCHORS

6. VERIFICATION ITEMS

- 6.1 The numbers in parentheses refer to the associated paragraphs in this section.
- 6.11 Correct type and thread size of anchors used in locations specified. (Paragraph 4.11)
- 6.12 Anchors shall be approximately flush or slightly underflush with the surface of the floor, wall or ceiling. (Paragraph 3.21)
- 6.13 Anchors properly expanded. (Paragraphs 3.21, 4.41, 4.42 and 4.43)

Engineering Planning Manager
(Installation)

Vertical lines at side of paragraphs
indicates requirements

Reason for Reissue:

- a) To incorporate UIS 9A dated 6-04-76
- b) General revision