DETERMINING LEVEL, AND HIGH AND LOW SPOTS IN FLOORS

CONTENTS

1. INDEX

2. GENERAL

2.1 Scope
2.2 Effect of Variations in Floor Level on Installing Operations
2.3 Factors Which Determine the Need for Checking Floor Level

3. INSTALLING EQUIPMENT

3.1 Tools
3.2 Materials

4. DETERMINING FLOOR LEVEL

1. INDEX

Subject	Figure No.	Paragraph Number
Effect of Variations in Floor Level		
On Equipment Lineups		2.21 to 2.32(E)
On Separated Units of Floor Mounted Equipment		2.21
Floor level		
Determining Variations In	1	4.1
Requirements Applying To		2.13
Variations Normally Encountered In		2.13
When Check Should be Made		4.1
Marking Floors		
To Indicate High and Low Spots		4.3
Use of Floor Markings		4.4
Straightedge, R-3052		
Description of	1,2	2.12
Precautions When Using	2	4.2
Tightening Height Adjusting Saddles	2	4.2 (Note)
Use of For Determining Floor Level	1	4.1

2. GENERAL

2.1 Scope

2.11 This section covers the installation procedures for determining the overall level and the locations of high and low spots in floors.

2.12 The information in this section covers the use of the new R-3052 Straightedge. The R-3052 tool is approximately 6-1/2 feet long and, in addition to leveling vials, is equipped with calibrated height adjusting saddles at both ends. (See Figure 1) The use of the R-3052 straightedge eliminates the need for (1) obtaining a suitable straightedge locally, (2) the use of a separate level and (3) the use of various sizes of spacing blocks for leveling the straightedge, as required in the past.

2.13 There are no installation requirements applying to the degree of level of the floors in buildings where telephone equipment is to be installed. However, very few floors are perfectly level, variations of 1/2" are quite common and cases have been encountered where the variation has been greater than 1".

2.2 Effect of Variations in Floor Level on Installing Operations

2.21 While variations in the floor level may have little, if no affect in the alignment of separated units of floor mounted equipment, the opposite holds true in the case of units that are junctioned together to form a continuous lineup. The extent that variations in the floor level will affect such lineups is dependent upon (1) the degree that the flat surfaces of adjacent units are permitted to be out-of-level with respect to each other and (2) the amount of clearance between the junctioning holes and the associated junctioning screws or bolts of adjacent units.

2.22 The requirements governing the permissible "out-of-level" between adjacent units of floor mounted equipment may vary from 1/64" to 1/8" depending upon the type of equipment being installed. The specific requirements applying to a particular type of frame, switchboard section or desk, etc., are contained in other sections of this handbook covering the erection and alignment procedures for the particular equipment involved.

2.23 The first unit to be installed in an equipment lineup, regardless of its relative position in the lineup, must be set at such a height above the floor that all subsequent units in the

ultimate length of the lineup can be properly junctioned and aligned without interference from high spots in the floor. Unless this is done the first unit to be installed might be at a lower or possibly the lowest spot in the floor with the result that the higher spots in the floor would have to be channelled out when subsequent units are installed or the units previously installed raised to the required level.

2.3 Factors Which Determine the Need for Checking the Floor Level

2.31 Not all equipment lineups have to be leveled to the same degree. Some frameworks may in general follow the contour of the floor while others have to be held to a close degree of level throughout the entire lineup. Consideration of these factors, as they apply to the framework units being installed, determines the extent to which variations in the floor level will affect the aligning operations, and, in that sense, the need for locating the high and low spots in the floor before starting a new lineup of equipment.

2.32 Typical examples of various types of switchboard sections and frameworks in the order in which they would be most affected by variations in the floor level are shown below.

(a) Most Affected - Lineups where the horizontal surfaces of adjacent keyshelves and piling rails have to be as near as practicable on the same level. (Variations not to exceed 1/64".) This includes all multiple type switchboard sections such as the No. 1, No. 10, No. 12 (integral upper and lower units) all universal (separate upper and lower units) sections such as the 1D, 3C, 3CF, 3CL, No. 5, 605 PBX and similar type switchboards.

(b) Next Affected - Lineups which may in general follow the contour of the floor provided that the difference in level between adjacent units, measured at their top surfaces, does not exceed 1/32". This includes all floor mounted sheet metal cabinets and casings such as AMA cabinets, TD2 power and similar cabinets when junctioned together to form a lineup, 1A translator cabinets and 23 type information desks.

(c) Less Affected - Lineups where adjacent frames may step up or down to conform to the general contour of the floor provided that the difference in level between the top surfaces of adjacent sheet metal guard rails does not exceed 1/16". This includes all shop welded frames such as the No. 1, No. 4 and No. 5 Crossbar frames, cable duct type frames, channel relay racks and all other frames having a sheet metal base construction. Also power board frameworks.

(d) Least Affected - Lineups where adjacent frames may step up or down to conform to the general contour of the floor provided that the difference in level between adjacent frames, measured at their bases, does not exceed 1/8". This applies to all shop welded frames not having sheet metal base construction. These bays may have either channel, angle or cable duct type uprights with or without detachable angle type guard rails.

(e) Not Affected

(1) Job assembled (bolted type) frames and racks in which the uprights are flexibly attached to long horizontal members and follow the general contour of the floor. This includes distributing frames, SxS frames, "I" beam relay racks and other frame structures of these general types.

(2) Separated units of equipment such as, chief operators desks, tables, dry cell battery cabinets and other units not junctioned together to form a continuous lineup. Since these units are leveled individually without regard to that of other floor mounted units there is no need for checking the floor level in areas where such equipment is to be installed.

3. INSTALLING EQUIPMENT

3.1 Tools

R-3051 Set, Level and Straightedge

3.2 Supplies

★612.169 Pencil, Red China Marking

★ Stationery Supplies

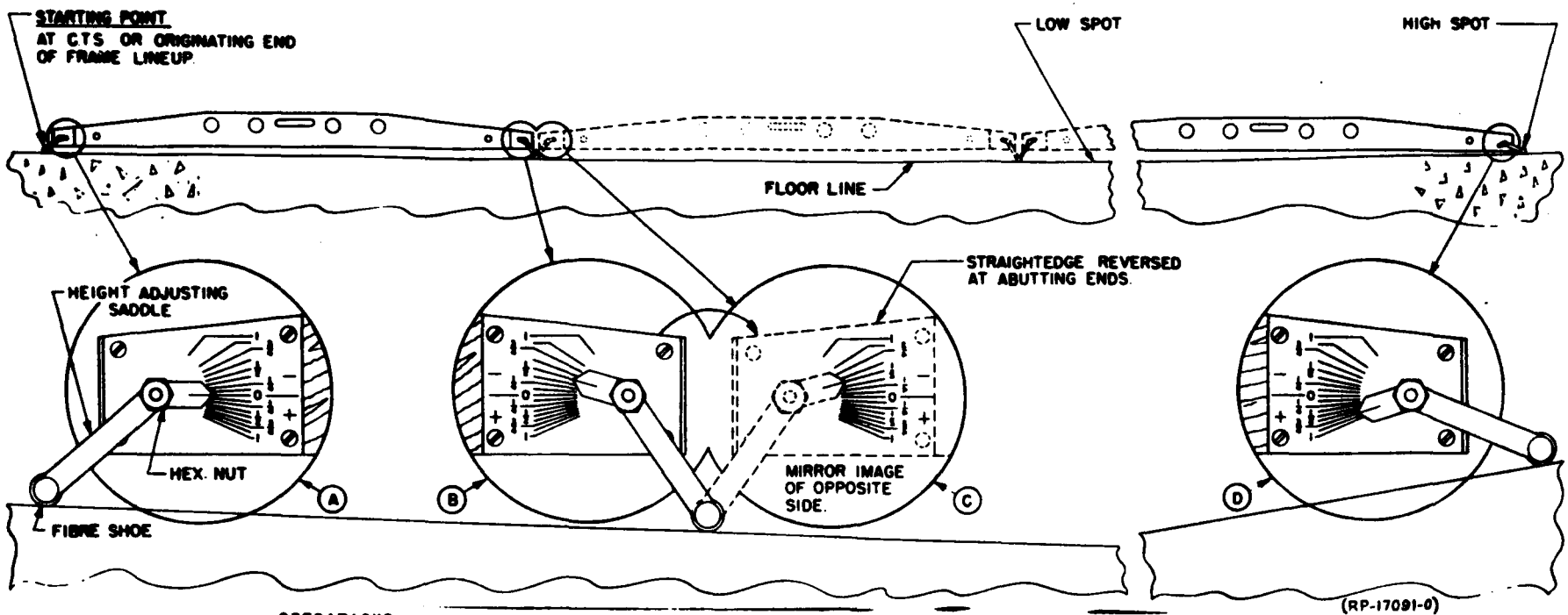
4. DETERMINING FLOOR LEVEL

4.1 The high and low spots in the floor can be readily determined using the R-3052 Straightedge as illustrated in Figure 1. This can be done at any time prior to installing the first unit in a lineup. However, it is recommended that the condition of the floors, with regard to level, be known as early as possible, so that suitable shims, when required, can be made available by the time the frameworks are to be aligned.

4.2 Care must be exercised when using the R-3052 Straightedge to prevent the height adjusting saddles from moving out of their preset position. When reversing the straightedge be sure that the fibre shoes are placed gently against the floor with the least amount of jarring.

NOTE: The hexagonal nuts on the height adjusting saddles should be securely tightened, that is, to the extent that the saddles will not be unintentionally moved away from the preset position during the normal use of the tool. Any wrench having a 7/16" opening is satisfactory for this purpose or the adjustable wrenches may be used. A cross section of the saddle assemblies showing the arrangement of the friction washers is shown in Figure 2.

4.3 Using a "red china" or other suitable marking pencil mark the floor each time the position of the straightedge is reversed to indicate the height at that particular spot with respect to the starting point. This, +1/2" would mean 1/2" higher than the starting point and -1/2" would indicate 1/2" lower than the starting position. Continue marking the floor in this manner throughout the ultimate length of the lineup.



OPERATIONS

A - AT STARTING POINT SET THE POINTER OF THE HEIGHT ADJUSTING SADDLE AT 0". THIS WILL PROVIDE FOR POSSIBLE VARIATIONS OF ONE INCH IN THE FLOOR LEVEL, EITHER ABOVE OR BELOW THAT OF THE STARTING POINT, THROUGHOUT THE LENGTH OF THE FLOOR.

B - ADJUST THE HEIGHT ADJUSTING SADDLE AT THE OPPOSITE END OF THE STRAIGHT EDGE SO THAT THE LEVEL VIAL INDICATES LEVEL. ANY DIFFERENCE IN FLOOR LEVEL FROM THAT AT THE STARTING POINT WILL BE INDICATED BY THE POSITION OF THE POINTER ON THE GRADUATED SCALE AT THIS END OF THE STRAIGHTEDGE. IN THE EXAMPLE SHOWN IN "B" ABOVE THE POINTER IS AT 1/2" ON THE MINUS (-) SIDE OF THE SCALE, INDICATING THE FLOOR TO BE 1/2" LOW AT THIS POINT WITH RESPECT TO THE STARTING POSITION "A".

C - REVERSE THE STRAIGHTEDGE AT EACH ADJACENT POSITION WITHOUT DISTURBING THE SETTING OF THE ADJUSTING SADDLE AT THE ABUTTING END. SEE "C" ABOVE. ADJUST THE HEIGHT ADJUSTING SADDLE AT THE OPPOSITE END, IF NECESSARY, SO THAT THE LEVEL VIAL INDICATES LEVEL.

D - CONTINUE OPERATIONS AS INDICATED ABOVE. IT SHOULD BE REMEMBERED THAT WITH THE STRAIGHTEDGE LEVEL IN EACH POSITION, THE READINGS SHOWN BY THE POSITIONS OF THE POINTERS INDICATES THE DIFFERENCE IN LEVEL AT THAT PARTICULAR LOCATION WITH RESPECT TO THE STARTING POINT. IN THE EXAMPLE SHOWN IN "D" ABOVE THE FLOOR IS 3/4" HIGH WITH RESPECT TO THE STARTING POINT "A".

NOTES

1. THE SCALES ARE GRADUATED IN FRACTIONS OF AN INCH. LINES ABOVE "0" ON THE MINUS (-) SIDE OF THE SCALE INDICATE "LOW" AND LINES BELOW "0" ON THE PLUS (+) SIDE OF THE SCALE INDICATE "HIGH" WITH RESPECT TO THE STARTING POINT.
2. THE HEX. NUTS MUST BE TIGHTENED SO THAT THE SADDLES WILL NOT BE UNINTENTIONALLY SHIFTED FROM THEIR PRE-SET POSITION DURING NORMAL USE OF TOOL. ANY WRENCH WITH A 7/16" OPENING IS SATISFACTORY.
3. THE ACCURACY OF THE STRAIGHTEDGE FOR LEVEL MAY BE CHECKED AS FOLLOWS: WITH THE POINTERS AT BOTH ENDS AT THE SAME SETTING, PREFERABLY AT "0", PLACE THE STRAIGHTEDGE ON A KNOWN LEVEL SURFACE. NOTE THE POSITION OF THE BUBBLE IN THE LEVEL VIAL, THEN REVERSE THE STRAIGHTEDGE. THE LEVEL VIAL SHOULD INDICATE LEVEL IN BOTH DIRECTIONS.
4. WHERE THE FLOOR IS PERFECTLY LEVEL THE DISTANCE BETWEEN THE BOTTOM OF THE STRAIGHTEDGE AND THE FLOOR WILL BE THE SAME THROUGHOUT THE LENGTH OF THE STRAIGHTEDGE. THIS WILL BE ONE INCH WHEN THE POINTERS ON BOTH HEIGHT ADJUSTING SADDLES ARE ON THE "0" MARK.
5. SINCE THE "OUT-OF-LEVEL" INDICATED BY THE HEIGHT ADJUSTING SADDLES APPLIES ONLY AT THE ENDS OF THE STRAIGHTEDGE, ANY NOTICEABLE HIGH OR LOW SPOTS OCCURRING IN THE LENGTH OF THE STRAIGHTEDGE, GREATER THAN THAT INDICATED BY THE HEIGHT ADJUSTING SADDLES, SHOULD BE CHECKED BY MEASURING THE DISTANCE BETWEEN THE BOTTOM OF THE STRAIGHTEDGE AND THE "HIGH" OR "LOW" POINT IN THE FLOOR WITH A SCALE.
6. REMEMBER THAT THE NORMAL CLEARANCE BETWEEN THE STRAIGHTEDGE AND THE FLOOR IS ONE INCH. THEREFORE, ONE INCH SHOULD BE SUBTRACTED FROM THE ACTUAL MEASUREMENT WHEN DETERMINING WHETHER THE "HIGH" OR "LOW" SPOT AT ANY INTERMEDIATE POINT IN THE LENGTH OF THE STRAIGHTEDGE EXCEEDS THAT AT THE ENDS.

FIG. 1 TYPICAL USE OF R-3052 STRAIGHTEDGE FOR DETERMINING LEVEL OF AND HIGH AND LOW SPOTS IN FLOORS
(Pars. 2.12, 4.1)

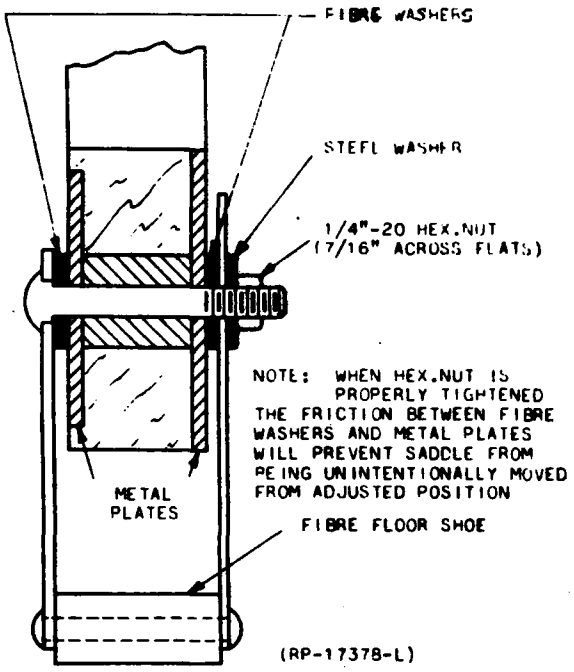


FIG. 2 ARRANGEMENT OF FRICTION FASTENINGS OF HEIGHT ADJUSTING SADDLES (Par. 4.2 Note)

4.4 The information marked on the floor will be later used in determining the height above the floor that the first unit to be installed in the lineup must be set at to insure that all other units in the lineup can be properly junctioned and aligned without the possibility of having to channel out the floor when the subsequent units are installed.

NOTE: This does not necessarily mean that the unit over the low spot in the floor has to be at the same height as the unit over the high spot since advantage can be taken of the requirements which permits adjacent units to step up or down in following the general contour of the floor. (See Paragraph 2.31.) Where such advantage is taken it might be possible for all the units of a lineup to be resting directly on the floor even with appreciable variation in the floor level.

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Replaces information for determining high and low spots in floor contained in Section 30 dated 5-18-50.