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METHOD FOR DETERMINING OPERATOR SEAT LOCATION ON AGRICULTURAL AND CONSTRUCTION MACHINES—SAE J1163

SPONSORED BY:
SOCIETY OF AUTOMOTIVE ENGINEERS, INC.

PUBLISHED BY:
SOCIETY OF AUTOMOTIVE ENGINEERS, INC., 400 Commonwealth Drive, Warrendale, PA 15096

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SAE Recommended Practice

Report of Joint Seating Subcommittee of the Tractor Technical Committee and the Construction Machinery Technical Committee approved October 1976. Rationale statement available.

1. Purpose—The purpose of this SAE Recommended Practice is to provide uniform methods for defining the location of the operator seat relative to other components on the machine. The resulting dimensions are intended to aid during the design phase of the machine and to determine compliance with applicable standards or regulations.

2. Scope—This recommended practice establishes procedures for determining seat location relative to basic datum points or planes on agricultural and construction machines. Alternate procedures are specified including an H-Point procedure to evaluate compliance with standards or regulations related to the H-Point, determined with the device specified in SAE J826b and a Seat Index Point (SIP) procedure to provide for use of a simplified device. When a specific procedure is not designated, the H-Point and SIP are equivalent and can be used interchangeably within normal measurement tolerances.

3. Definitions

3.1 H-Point—The pivot center of the torso and thigh of the SAE J826b Three-Dimensional H-Point Device when installed in the operator seat as designated in Section 5.1. The H-Point is in the central, vertical, longitudinal plane of the H-Point device. The H-Point is fixed with respect to the machine and does not move with the seat through its adjustment and/or oscillation range.

3.2 Seat Index Point (SIP)—The point in the central, vertical, longitudinal plane of the SIP Measuring Device shown in Fig. 1 when installed in the operator seat as designated in Section 5.2. The SIP is fixed with respect to the machine and does not move with the seat through its adjustment and/or oscillation range.

4. Test Preparation

4.1 Measurement Site—The machine should be on a level surface. When the H-Point device is used for seat measurement separately from the machine, a platform or footrest must be provided to allow leg placement according to Section 5.1.2.

4.2 Seat Adjustment—All fore and aft, vertical, and angular adjustments shall be placed in their center position. When no center position is possible, the nearest adjustment above or rearward of center should be used.

4.3 Seat Suspension Adjustment

4.3.1 Adjustable suspensions shall be adjusted so that the suspension system is at the center of its oscillation range with the weighted device in place. The suspension may be mechanically blocked in this position during the measurement procedure.

4.3.2 Non-adjustable suspensions shall be blocked in the vertical position attained with the weighted device in place.

4.4 Manufacturer's Instructions—If the adjustments in Sections 4.2 and 4.3 are in conflict with the manufacturer's stated instructions, then the manufacturer's instructions shall be followed to obtain the recommended adjustment for a 75 kg seated operator.

4.5 Seat Cushion Preparation

4.5.1 Sufficient time should be allowed to insure that the seat reaches room temperature prior to the measurement.

4.5.2 If the seat has not been used, a 68-79 kg person shall sit in the seat twice for 1 min intervals to flex the cushion and back rest. The seat should remain unloaded for a minimum period of one half h prior to the measurement.

4.5.3 Cover the seat with muslin cotton cloth of sufficient size to prevent direct contact between the cushion surfaces and the measurement device. The cloth should be tucked in to prevent hammocking of the material.

5. Measurement Procedure

5.1 Seat H-Point General Procedure

5.1.1 Adjust the lower leg and thigh segments of the Three-Dimensional H-Point Device to the 50th percentile length and attach foot assemblies.

5.1.2 Place the H-Point device, less weights, on the seat cushion with the torso-thigh pivot axis horizontal and with the feet on the platform or footrest in normal operator position. Where not otherwise defined, feet should be placed approximately 250 mm apart with leg segments vertical. The knee-joint T-bar should be maintained horizontal and at right angles to the longitudinal centerline of the seat during the measurement procedure. The H-Point device should be centered on the seat cushion in the normal operator position.

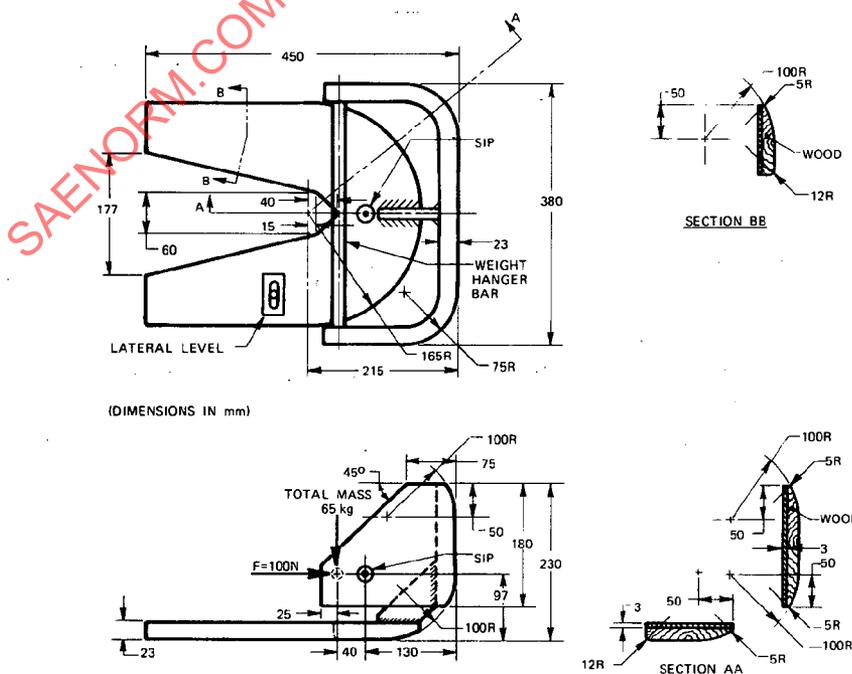


FIG. 1—SEAT INDEX POINT MEASURING DEVICE

5.1.3 Place the upper torso of the H-Point device against the seat back.

5.1.4 Apply lower leg and thigh weights and level the H-Point device.

5.1.5 Bend the torso forward and draw the H-Point device away from the seat back using the T-bar.

5.1.6 Slide the H-Point device rearward applying a horizontal rearward force at the T-bar until the device contacts the seat back.

5.1.7 Alternately apply and release a generally horizontal and rearward force of approximately 100 N to the H-Point device. The force should be applied parallel to the thigh bar at a point directly above its intersection with the hip angle quadrant (see Fig. 2 of SAE J826b). Repeat the application and release of the force a second time.

5.1.8 Carefully tilt the torso rearward to contact the seat back. Care must be exercised through the remainder of the procedure to prevent the H-Point device from sliding forward.

5.1.9 Install the right and left buttock weights and then alternately the eight torso weights while maintaining the H-Point device level.

5.1.10 Bend the torso forward and gently rock the H-Point device from side to side over approximately a 10° angle for three complete cycles to remove any accumulated friction between the device and the seat surfaces, and return the device to level position. Maintain the knee joint T-bar in a horizontal position during the rocking procedure using a minimum of exterior force.

5.1.11 Tilt the torso rearward to contact the seat back and gently rock the torso in the fore and aft direction to establish a stable position.

5.1.12 Check level of the H-Point device. If a level adjustment is necessary, repeat steps 5.1.10 and 5.1.11 until a level position is obtained.

5.1.13 Measure and record the perpendicular distance (A, Fig. 2) from the H-Point to a plane through the top surface of the platform or footrest. Measure and record the distance (B, Fig. 2) parallel to the above plane from the H-Point to a clearly defined fixed point or plane on the machine or seat mounting base. The measurements should be determined on each side at points equal distance from the center of the H-Point device and the average values reported. When no definite plane through the platform or footrest can be determined, alternate points or planes shall be used and clearly reported. The seat or suspension position shall be recorded if a centered position cannot be determined as specified in Sections 4.2 and 4.3. Record any deviations required to complete the measurement procedure.

5.2 Seat Index Point General Procedure

5.2.1 Place the SIP Measuring Device, less weights, on the seat cushion and slide the device rearward to the contact the seat back. The SIP device should be centered on the cushion in the normal operator position.

5.2.2 Add weights as indicated by the vertical arrow in Fig. 1 to bring the total mass of the device to 26 ± 1 kg and adjust the device to a level position.

5.2.3 Alternately apply and release a horizontal, rearward force of approximately 100 N at the center of the weight hanger bar of the device as indicated by the horizontal arrow in Fig. 1.

5.2.4 Add additional weights to bring the total mass of the device up to 65 ± 1 kg and readjust the device to a level position.

5.2.5 Measure and record the perpendicular distance (A, Fig. 2) from the SIP to a plane through the top surface of the platform or footrest. Measure and record the distance (B, Fig. 2) parallel to the above plane from the SIP to a clearly defined fixed point or plane on the machine or seat mounting base. The measurements should be determined on each side at points equal distance from the center of the SIP Measuring Device and the average values reported. When no definite plane through the platform or footrest can be determined, alternate points or planes shall be used and clearly reported. The seat or suspension position shall be recorded if a centered position cannot be determined as specified in Sections 4.2 and 4.3. Record any deviations required to complete the measurement procedure.

6. General Comments

6.1 If seat adjustment positions other than the centered position specified in Section 4.2 are required in a specific standard or regulation, the resulting dimensions shall be extrapolated to provide coordinates relative to the actual H-Point or SIP as defined in Sections 3.1 and 3.2.

6.2 If the Three Dimensional H-Point Device or the SIP Measuring Device is used with seat adjustment positions other than the centered position specified in Section 4.2, the resulting dimensions shall not be defined as H-Point or SIP.

6.3 It shall be permissible for the seat manufacturer to designate the position of the H-Point or SIP relative to the cushion or frame of the suspended portion of the seat to aid in establishing seat location during the design phase of the machine (see dimensions C and D, Fig. 2).

7. References

7.1 SAE J826b—Devices for Use in Defining and Measuring Vehicle Seating Accommodation

7.2 ISO/DP 5353—Determination of Seat Index Point for Work Vehicles

7.3 ISO 3462 Agricultural Tractors and Machinery—Seat Reference Point

7.4 SAE Information Report—Evaluation of Seat Index Point Checking Device for Tractor (D. C. Hammond) 15 April 1976.

7.5 ISO/TC 127/SC2 (Italy-22)—Correlation Between the Seat Index Point and the H-Point—October 1975

7.6 BSI Document 75/13289—Seat Index Point—18 December 1975

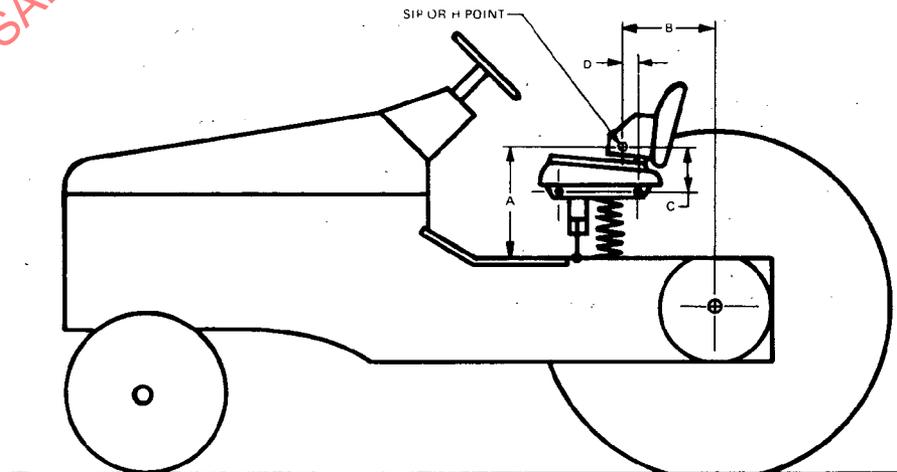


FIG. 2—SEAT DIMENSIONS