The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

SURFACE VEHICLE RECOMMENDED PRACTICE

SAE J1289

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MOBILE CRANE STABILITY RATINGS

***Foreword*—**This Document has not changed other than to put it into the new SAE Technical Standards Board Format.

1. ***Scope*—**This recommended practice applies to mobile, construction-type lifting cranes with either lattice booms or cantilevered, telescopic booms.

1.1 **Purpose—**To establish conditions to be taken into consideration in determining rated loads for mobile cranes when overturning stability is the controlling factor.

2. ***References***

2.1 **Applicable Publication—**The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated the latest revision of SAE publications shall apply.

2.1.1 SAE PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J765—Crane Load Stability Test Code

3. ***Limitations*—**The rated loads established under this recommended practice require that the crane be mounted level on a firm supporting surface and that the crane be assembled and rigged in accordance with the manufacturer's printed instructions. The user must derate for adverse conditions.

4. ***Stability Calculations***

4.1 Calculations are to be carried out in those positions or configurations for which stability is at a minimum. If different ratings are to be specified for different working areas, calculations shall be made to check stability for each published working area.

4.2 The following equation Equation 1 shall be used to establish stability based rated loads, *P*:

$$P \leq \frac{T - 0.1F}{1.25} \qquad \text{(Eq. 1)}$$

where the constants 0.1 and 1.25 are dimensionless.

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4.2.1 TIPPING LOAD, *T*, BY CALCULATION—When tipping loads are established by calculation, the weight of the suspended load hoist lines are to be considered as part of the weight of the crane. For all cranes, parts of line sufficient to support the rated load at the minimum rated radius for the applicable boom length, shall be taken and the length of the lines shall be the vertical distance from the boom point sheave shaft to the ground at the applicable radius. The weights of all hoist line rollers or guides and all required rigging and accessories shall be taken into account. Boom, boom hoist spreader, and boom foot master centers of gravity shall be taken in their true positions.

4.2.2 TIPPING LOAD, *T*, BY TEST—If tipping load is established by test, use the procedures and definitions of SAE J765.

4.2.3 LOAD FACTOR *F*—Factor *F* is a load factor assumed to act at either main boom point (F_b) or jib point (F_j), depending on which is doing the lifting. F_b may be determined by either calculation or test; F_j is calculated from F_b. *F* is determined with the boom in a horizontal position and assumed constant for any boom angle at which a rating is given.

4.2.3.1 *Boom F_b Without Jib—F_b* is the vertical reaction acting at centerline of boom point sheaves with boom horizontal and supported only by boom foot pins and the force F_b. Boom to be equipped with all required or specified appendages such as boom rollers, guide sheaves, or stored jib. Items not to be included are load hoist ropes and boom support system parts. To avoid possible structural damage, consult manufacturer before applying this procedure as a test method.

4.2.3.2 *Boom F_b With Jib—F_b* is the vertical reaction acting at the centerline of boom point sheaves with the boom and jib as near horizontal as possible and supported only by the boom foot pins and the force F_b. Jib to be at minimum offset angle. Boom to be equipped with all required or specified appendages such as boom rollers or guide sheaves. Items not to be included are load hoist ropes and boom support system parts. Jib to be equipped with all required or specified appendages including jib support system parts but not to include load hoist rope.

To avoid possible structural damage, consult manufacturer before applying this procedure as a test method.

4.2.3.3 *Jib F_j With Boom-Jib Combination—F_j* is determined by calculation from the F_b determined in 4.2.3.2.

$$F_j = F_b \times \frac{\text{Boom Length}}{\text{Boom} + \text{Jib Length}} \qquad \text{(Eq. 2)}$$

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