Proof of strength for drawbars for single-axle trailers taking the transverse force at the drawbar connection point into account

1.   Preface:

1.1   Definition:

Transverse force in this meaning is the force that has an effect on the side of the draw bar.

The components that connect the chassis of a central-axle trailer to the towing motor vehicle, but all components as from the lower edge of the chassis or the body mounting as a minimum are deemed to be the draw bar or such as belong to the draw bar. (Fig.1)
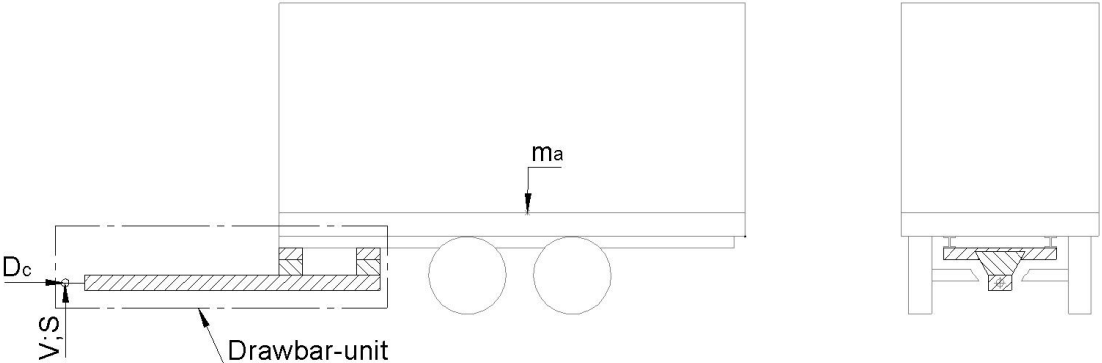

Fig.1 *Drawbar-unit*

1.2   Design:

In addition to the known design of a drawbar for a single-axle trailer, proof of strength at the connection point is to be provided with the assistance of parameters Dc; V; S, taking the transverse force (Fqc) into account.

This can be calculated on the basis of the equation derived under 1.3.

Proof of hardness with regard to the transverse force is not required if the vertical moment of inertia (Iy) of the drawbar profile is equal to or greater than the required horizontal moment of inertia (Ix). (Fig.2)

A computed proof of strength for the connecting components (cross-members, consoles) between the drawbar and the chassis (Fig.1) with the assistance of the parameters Dc; V; S are necessary.
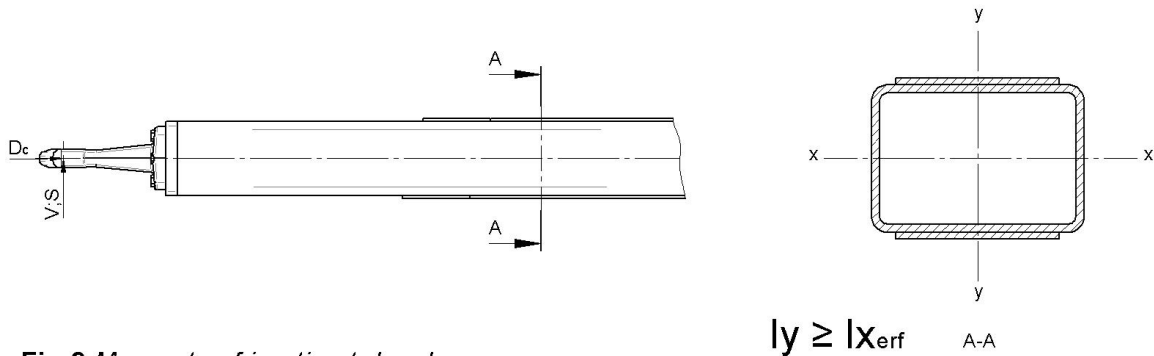

$$I_y \geq I_{x_{erf}} \qquad \text{A-A}$$

Fig.2 *Moments of inertia at drawbars*
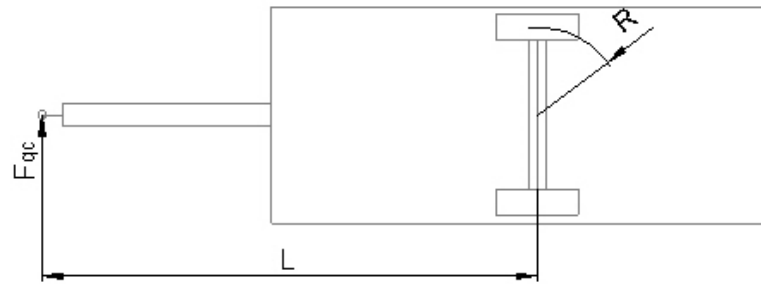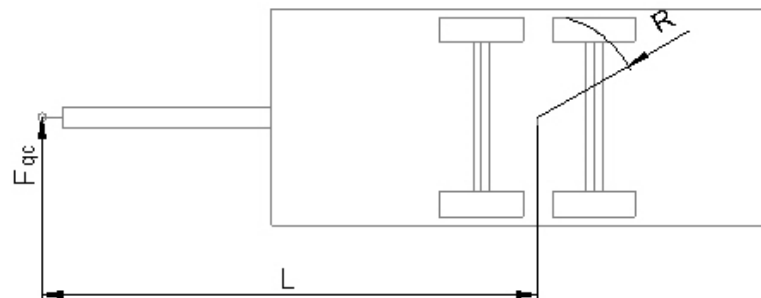
1.3   Derivation:
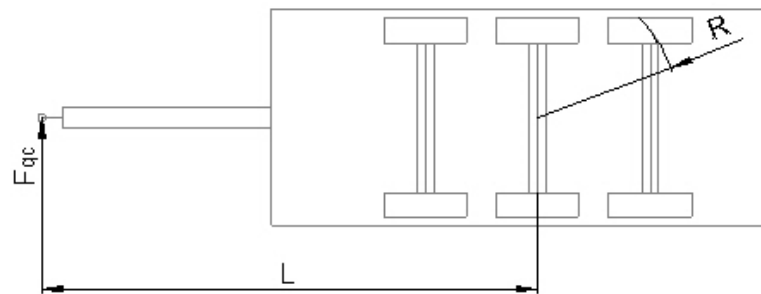
Fig.2

Fig.3

Fig.4

$$F_{qc} = \frac{ma * g * R}{L}$$

1.4   Rating:

The transverse force (Fqc) does not need to be included on the rating plate. It serves as a parameter for the strength verification of the draw bar during the type approval.

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