# Allgemeines und Berechnungen
# *General application and calculation*

## Mechanische Grundlagen und Lenkungsauswahl
## *Sizing and steering system design process*

### Schritt 1:
Berechnung des benötigten Lenkdrehmohments
$M_L$ [daNm]; [lb-in]

$$M_L = G \times \mu \sqrt{\frac{B^2}{8} + l^2}$$

**Achtung:** Wenn die zu lenkenden Räder angetrieben werden => $M_L$ x 2

$M_L$: Lenkdrehmoment [daNm]; [lb-in]
**G:** Gewicht auf der Lenkachse [daN]; [lbs]
**μ:** Reibungsbeiwert (siehe Kennlinie auf Bild 1)
**B:** Querschnitt Reifenaufstand [mm]; [in]
**l:** Maß zwischen senkrechter Gelenkachse und Hälfte des Reifens (Lenrollhalbmesser) [mm]; [in] (siehe Bild 2)

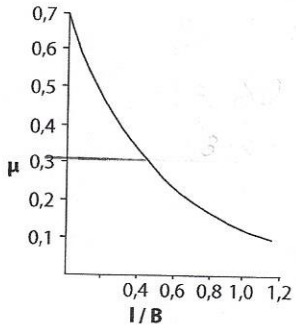



**Bild 1**

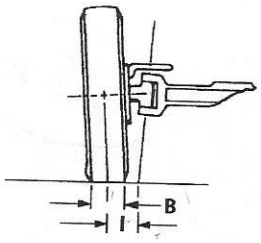


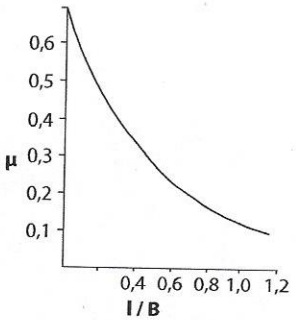

**Bild 2**

### *Step 1:*
*Calculate approximate kingpin torque*
$M_L$ *[daNm]; [lb-in]*

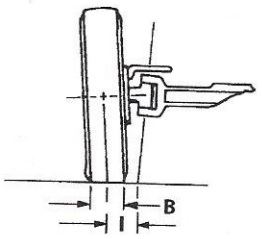
$$M_L = G \times \mu \sqrt{\frac{B^2}{8} + l^2}$$

***Note:*** *If steered wheels are powered =>* $M_L$ *x 2*

$M_L$: *Kingpin torque [daNm]; [lb-in]*
**G:** *Vehicle weight on steered axle [daN]; [lbs]*
**μ:** *Coefficient of friction (see picture 1)*
**B:** *Nominal width of tyre print [mm]; [in]*
**l:** *Kingpin offset. The distance between tyre centerline intersection at ground and kingpins centerline intersection at ground [mm]; [in] (see picture 2)*




***Picture 1***




***Picture 2***

### Schritt 2:
Berechnung des benötigten Zylinders

**Lenkkraft**

$$F = \frac{M_L}{r}$$

**F:** Lenkkraft [daN]; [lbs]
$M_L$: Lenkdrehmoment aus Schritt 1[daNm]; [lb-in]
**r:** kleinster Momentarm für Lenkzylinder [mm]; [in] (siehe Bild 3 und 4)

**Bild 3**

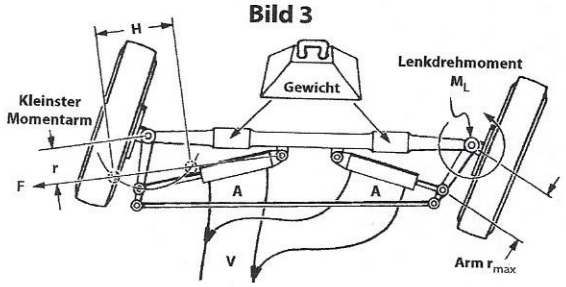
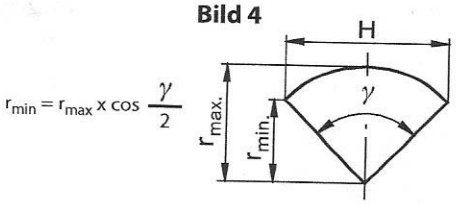



**Bild 4**



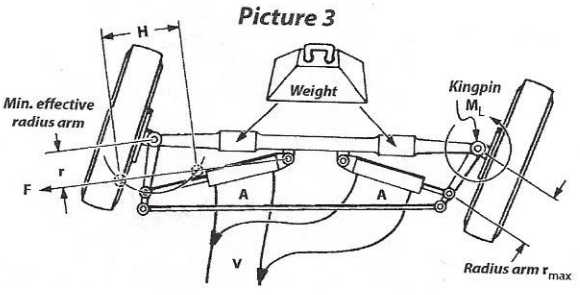

### *Step 2:*
*Calculate approximate cylinder*

***Force***

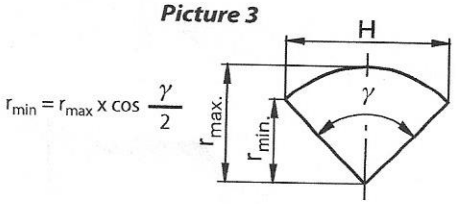
$$F = \frac{M_L}{r}$$

**F:** *Force required to steer axle [daN]; [lbs]*
$M_L$: *Kingpin torque from step 1[daNm]; [lb-in]*
**r:** *Effective radius arm [mm]; [in] (see picture 3 and 4)*

***Picture 3***




***Picture 3***



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