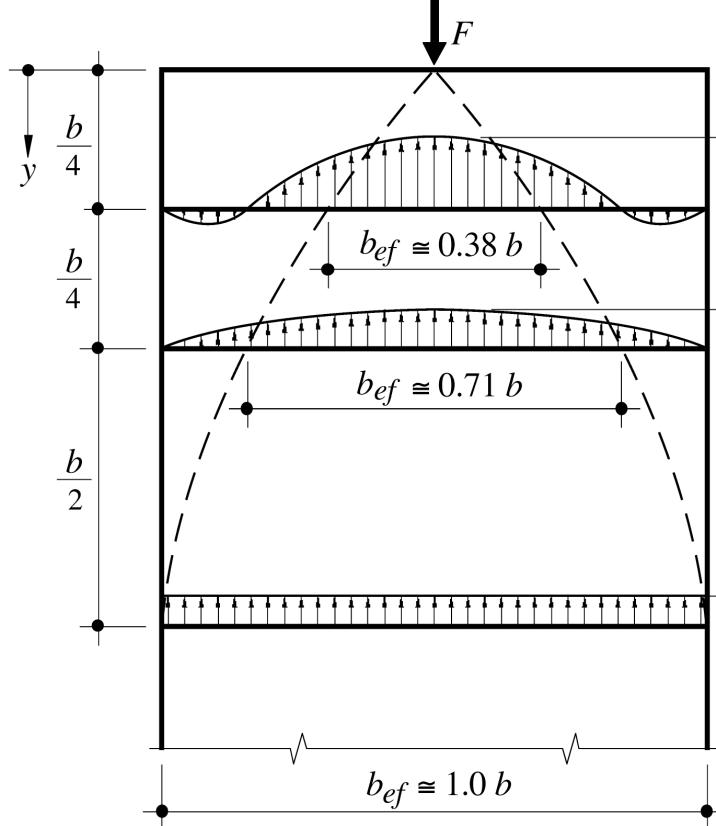


# COURS STRUCTURES EN MÉTAL

TGC 11 section 12.3:  
Dimensionnement goussets de treillis

# Fig. 12.18: Introduction d'une force concentrée dans une plaque

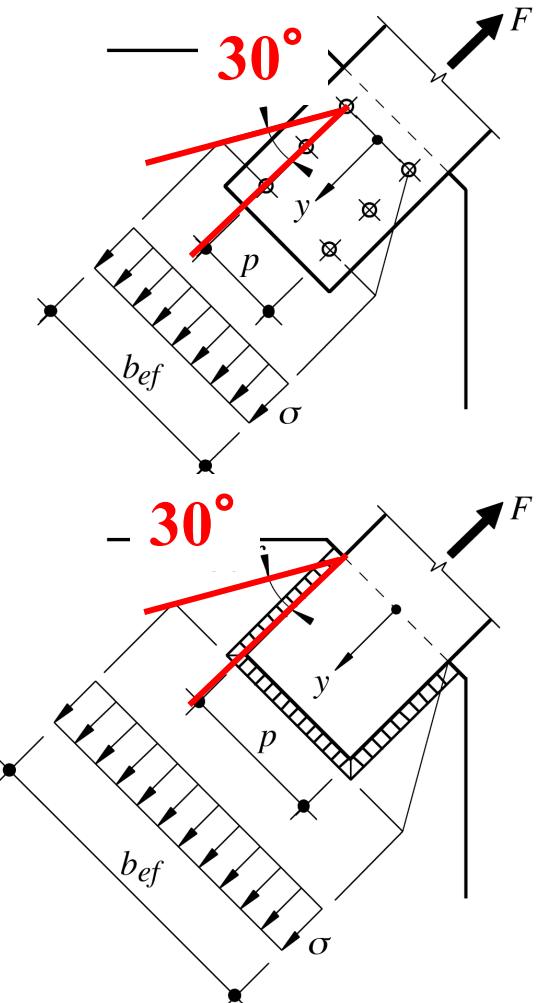


(a) Schéma de répartition des contraintes

$$\sigma_{max} \approx 2.6 \frac{F}{bt}$$

$$\sigma_{max} \approx 1.4 \frac{F}{bt}$$

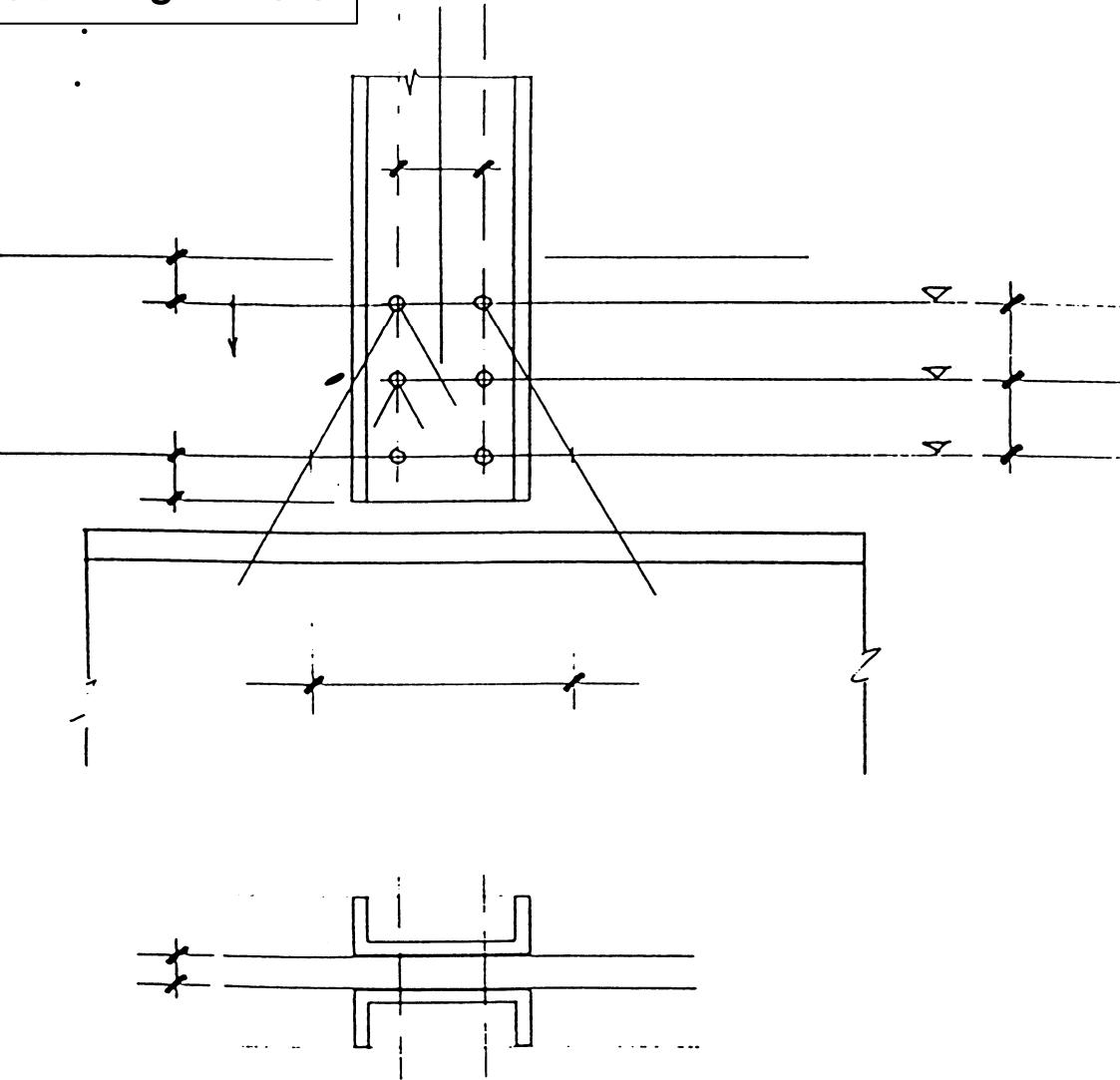
$$\sigma_{max} \approx 1.0 \frac{F}{bt}$$



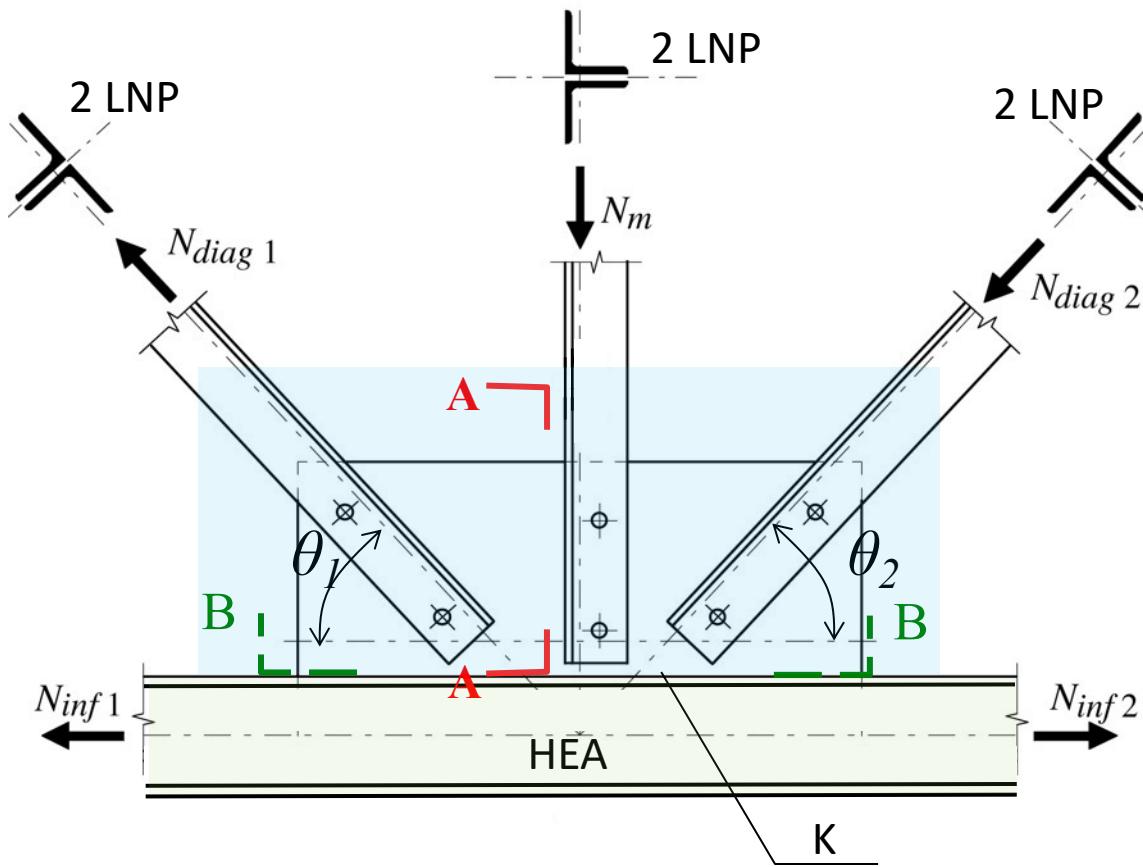
(b) Largeur efficace

# Introduction de force dans gousset, procédure de dimensionn.

TGC 11 § 12.3.5



On peut séparer le problème en 2:



Répartition plastique

Section A-A:  
Seule composante  
verticale dans gousset

$$V_{A-A,Ed} = N_{diag1} \cdot \sin \theta_1$$

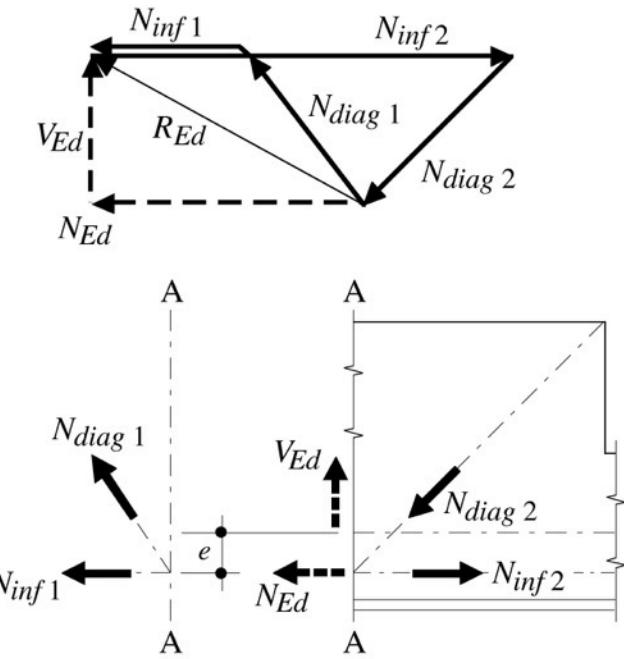
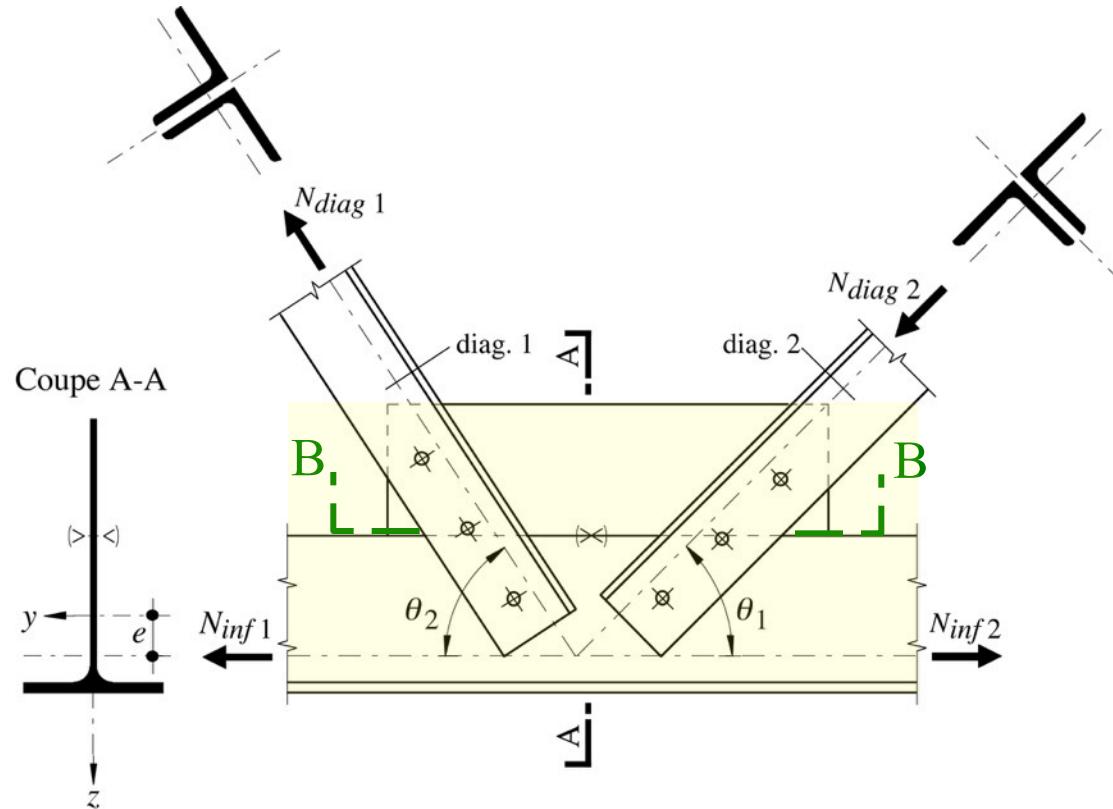
Section B-B:  
Seule composante  
horizontale

$$V_{B-B,Ed} = N_{diag1} \cdot \cos \theta_1 + N_{diag2} \cdot \cos \theta_2$$

ou bien  $V_{B-B,Ed} = N_{inf2} - N_{inf1}$

# TGC 11, Fig 12.19: gousset faisant partie de la membrure

On ne peut pas séparer, il faut analyser la section complète:



# Treillis, noeuds tubulaires

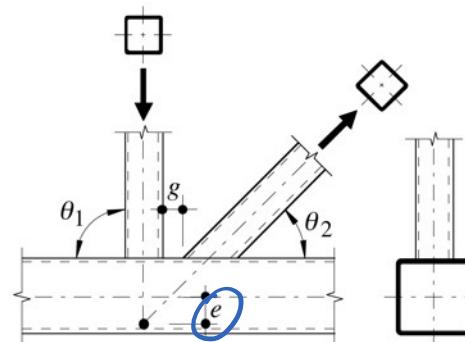
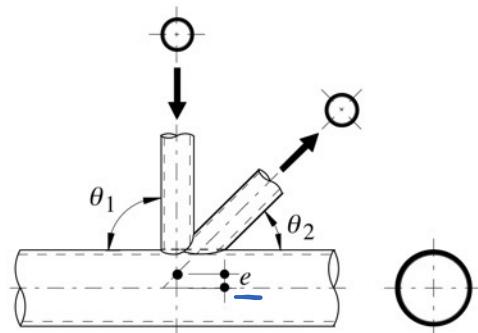
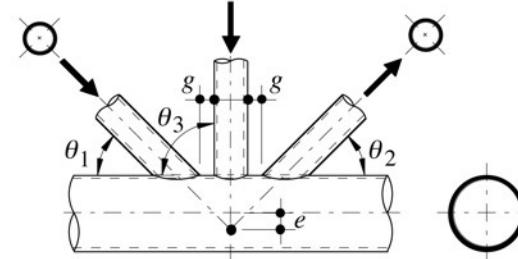
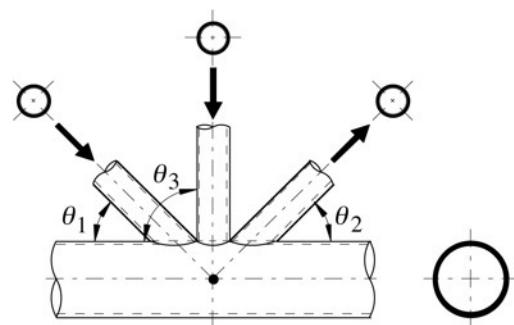
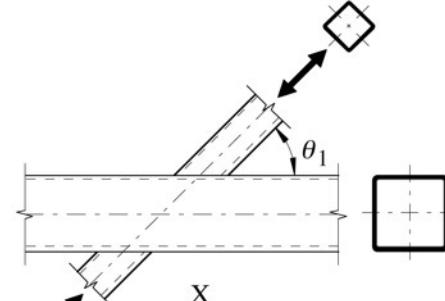
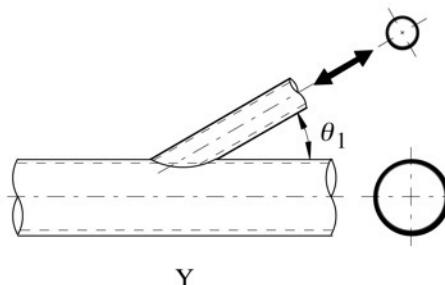
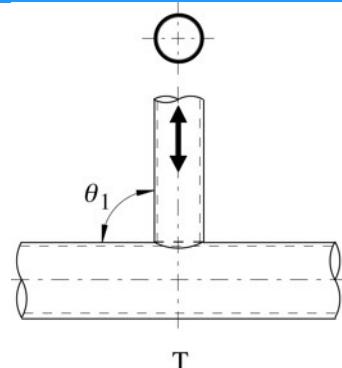


Aujourd'hui viaduc de Lully

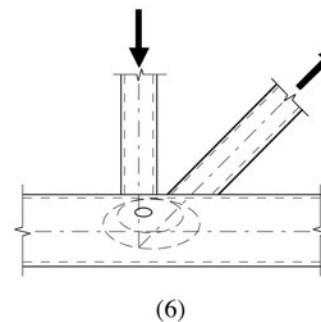
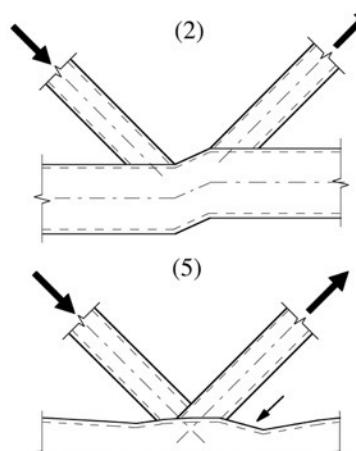
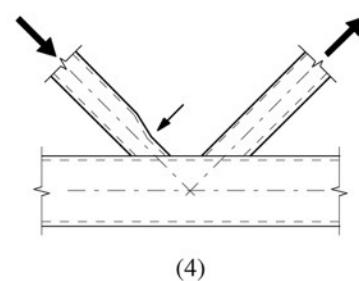
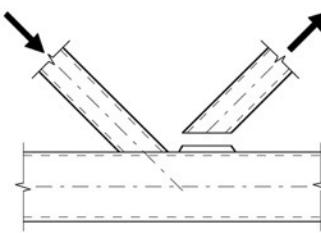
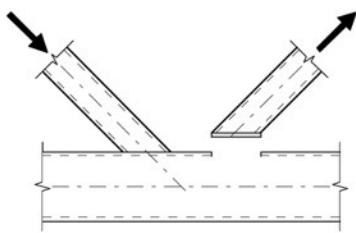
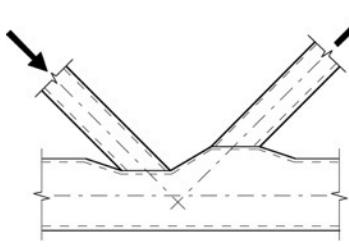


Pont du Forth, Ecosse (1890)

# TGC 11, Fig 12.21: exemples de types de nœuds tubulaires

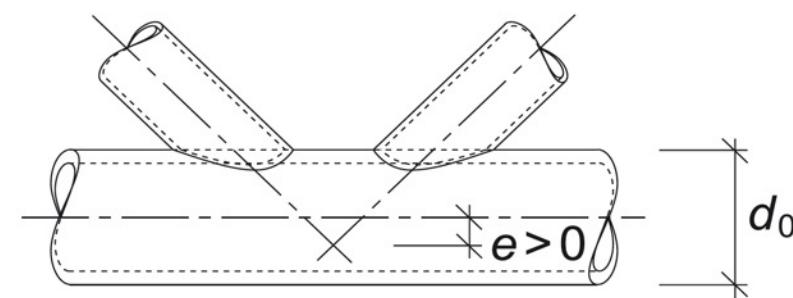
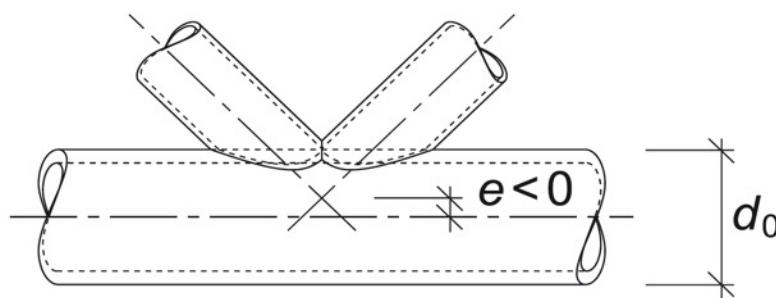


# TGC 11, Fig 12.22: modes de rupture de nœuds tubulaires



Conditions:

- $2.5 \leq t \leq 25 \text{ mm}$
- Angles  $\geq 30^\circ$
- Classes de section 1 ou 2
- Excentricité:



L'excentricité peut être négligée si  $-0,55 d_0 \leq e \leq 0,25 d_0$

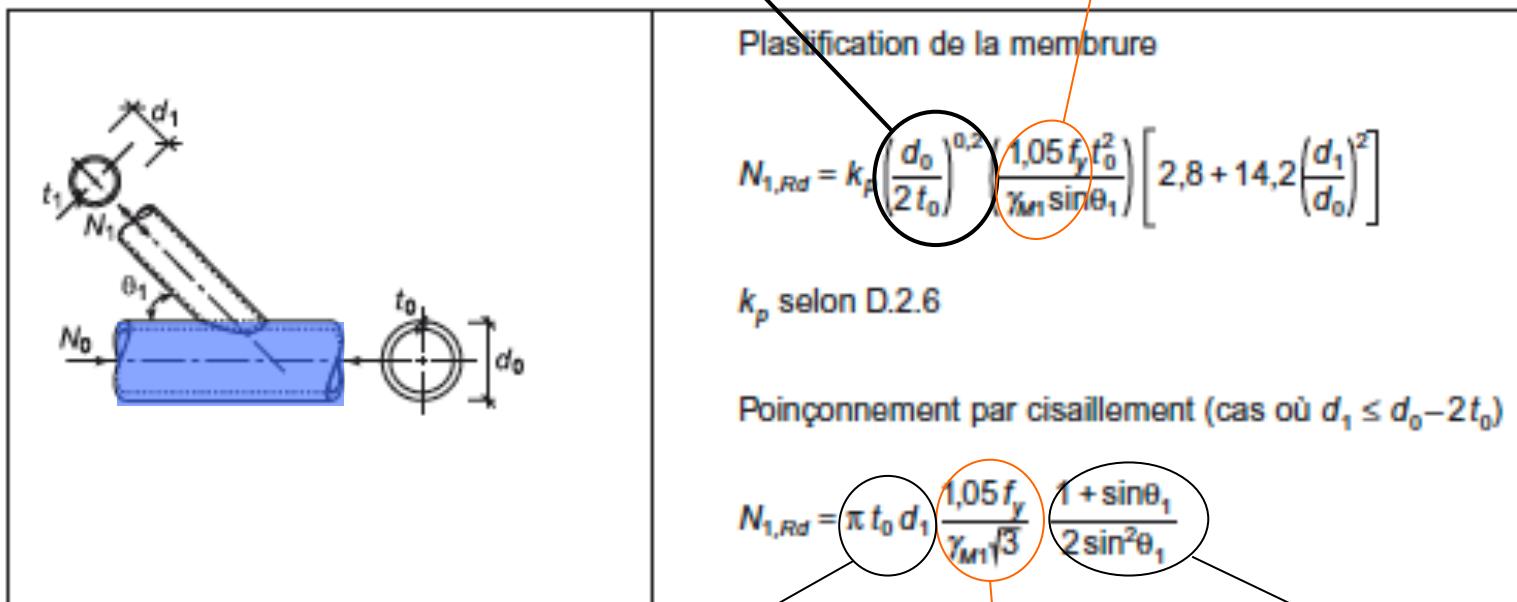
## EXEMPLE:

D.2.2

Nœuds en T et en Y

### Elancement membrure

Contrainte limite  
de traction



Plastification de la membrure

$$N_{1,Rd} = k_p \left( \frac{d_0}{2t_0} \right)^{0,2} \left( \frac{1,05 f_y t_0^2}{\gamma_M \sin \theta_1} \right) \left[ 2,8 + 14,2 \left( \frac{d_1}{d_0} \right)^2 \right]$$

$k_p$  selon D.2.6

Poinçonnage par cisaillement (cas où  $d_1 \leq d_0 - 2t_0$ )

$$N_{1,Rd} = \pi t_0 d_1 \frac{1,05 f_y}{\gamma_M \sqrt{3}} \frac{1 + \sin \theta_1}{2 \sin^2 \theta_1}$$

Section cisaillée  
membrure sous  $N_1$

Contrainte limite  
de cisaillement

Correction fonction  
angle diagonale

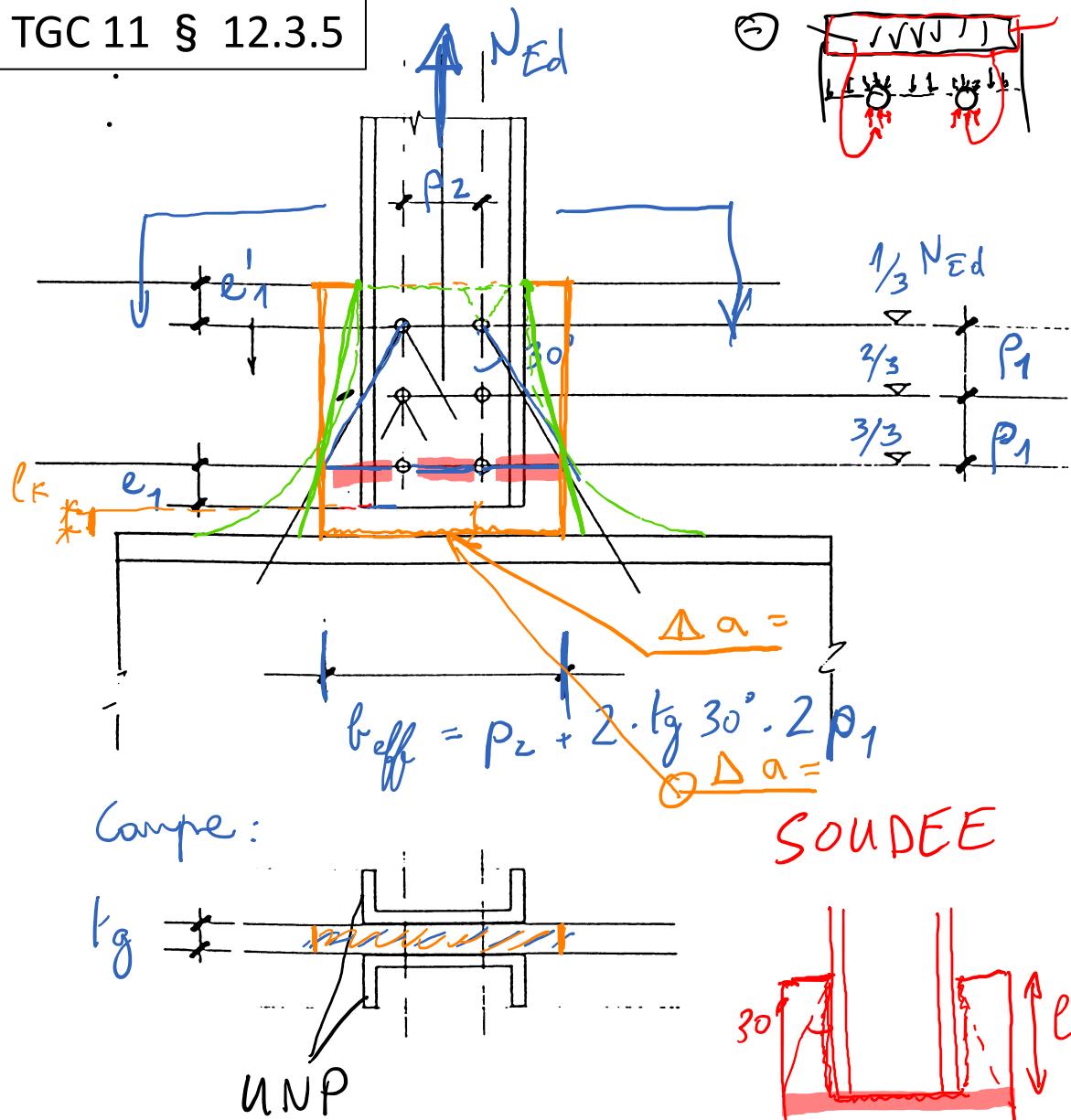
- Brochures, outils et logiciels de calcul multilingues pour structures tubulaires:<http://www.cidect.org>
- y.c. logiciel online:
  - CIDJOINT, vérification de résistance des assemblages sous charges statiques selon EC3



Bâtiment exposition Gétaz-Romand Aubonne

# Introduction de force dans gousset, procédure de dimensionn.

TGC 11 § 12.3.5



Prof. A. Nussbaumer

1) Nb boulons, ol ?

$$N_{Ed} \leq n \cdot F_{V,Rd}$$

→  $n, d$  Hyp.:  $n = 6$

→  $e_1, p_1, p_2$

2) diffusion à  $\pm 30^\circ$

→  $b_{eff}$

3) Épaisseur gousset ?

- section nette }  $t_g$
- " brute }  $t_g$

4) Vérif. pression lat. →  $e'_1$

5) forme gousset.

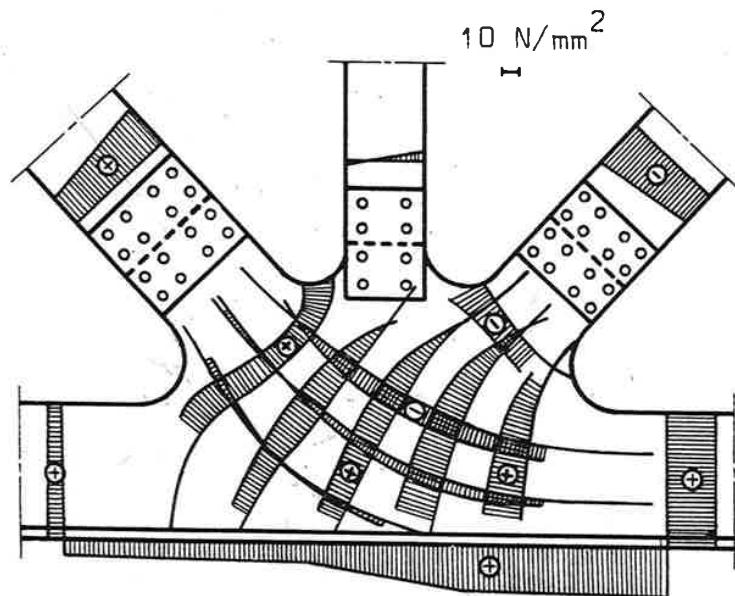
6) Soudure:

  $a = \text{calcul.}$

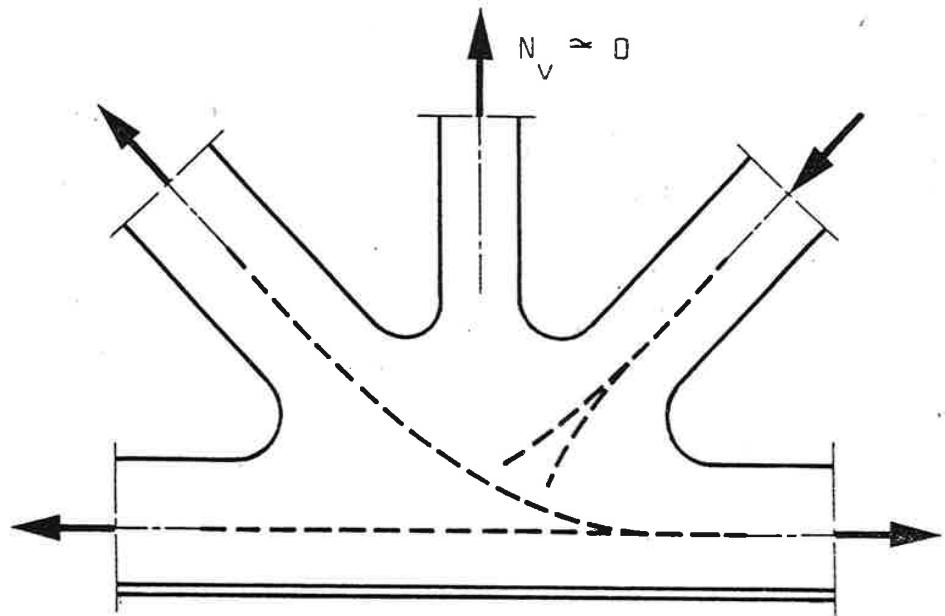
 pas de calcul

# ANNEXE: principe de transmission des forces dans un noeud

a) Contraintes mesurées dans un gousset de pont-rail.

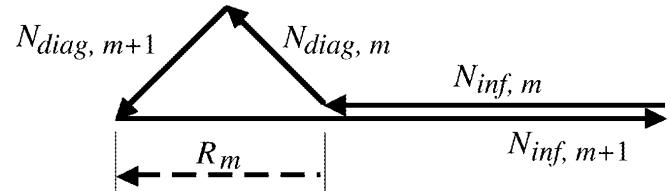
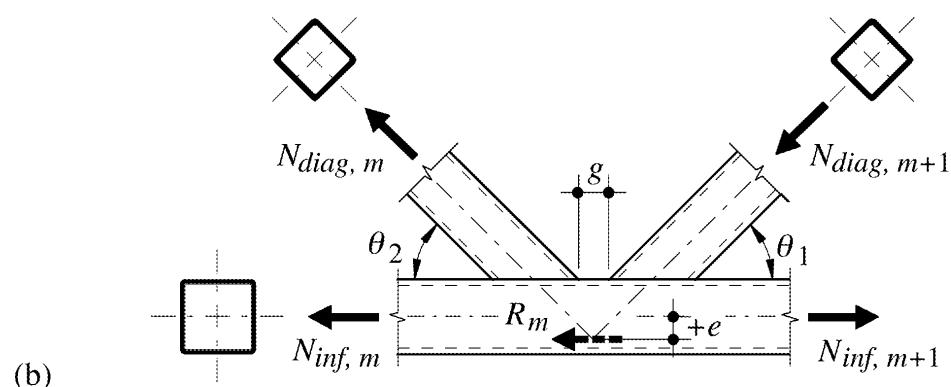
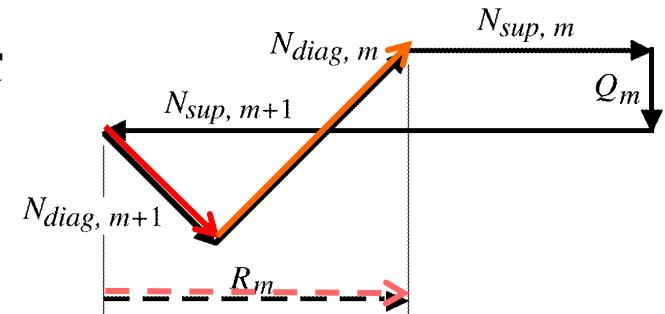
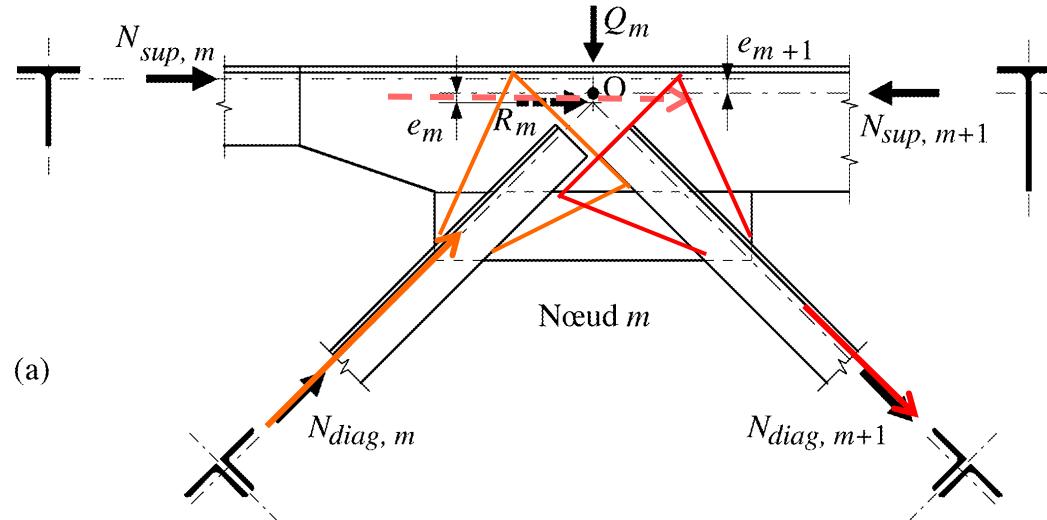


b) Principe de transmission des forces.

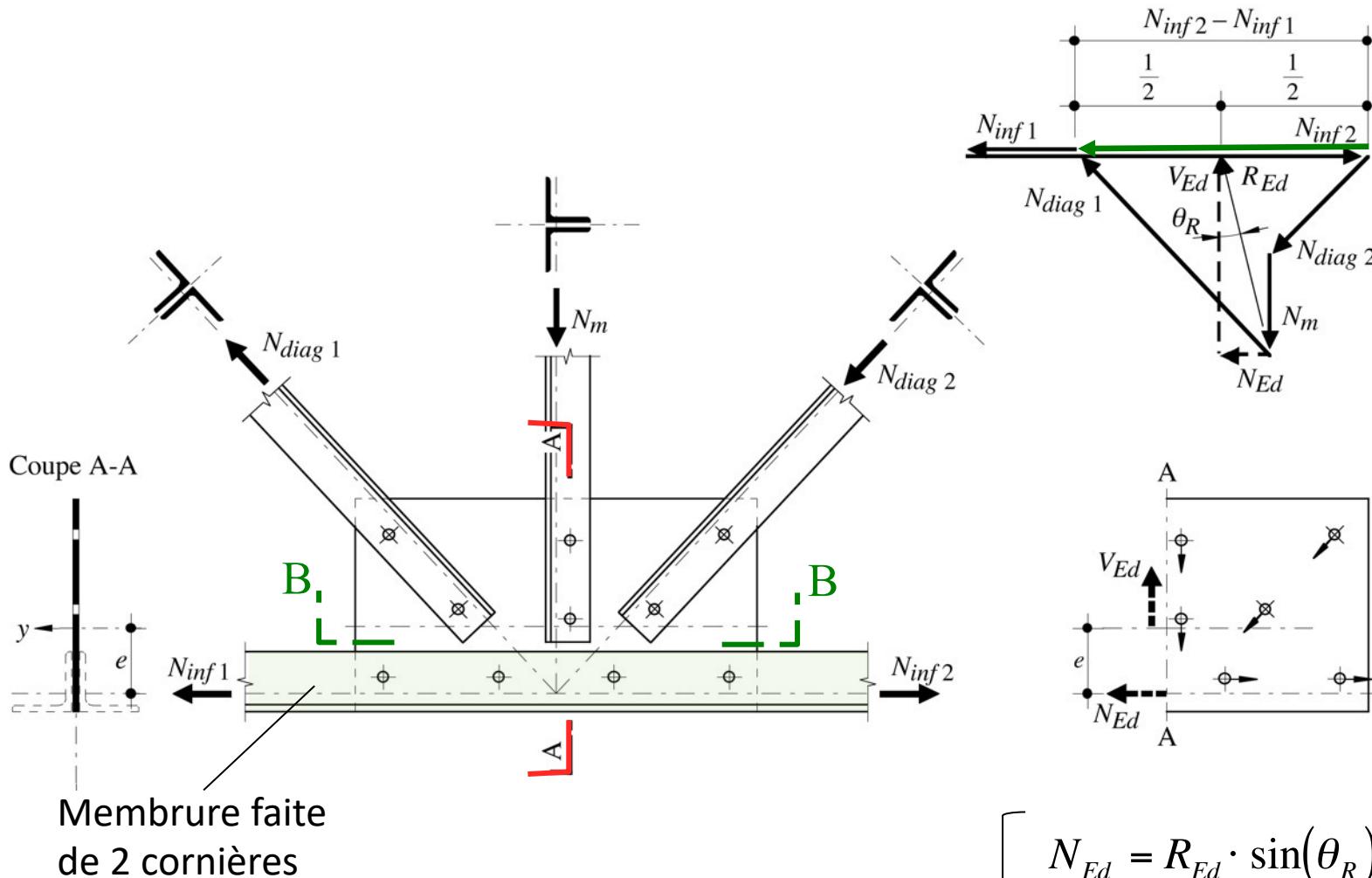


# ANNEXE: TGC 11, Fig 12.10: nœuds avec barres non-concourantes, goussets avec plusieurs forces

Autour de O:  $R_m \cdot e_m - N_{\text{sup},m} \cdot e_{m+1} = 0$



# ANNEXE: Fig 12.20: gousset ne faisant pas partie de la membrure



Vérification section A-A:

$$\left\{ \begin{array}{l} N_{Ed} = R_{Ed} \cdot \sin(\theta_R) \\ V_{Ed} = R_{Ed} \cdot \cos(\theta_R) \\ M_{Ed} = N_{Ed} \cdot e \end{array} \right.$$