



HEXAGON

 simufact

FEM simulation of sheet piles joints

- FSC120-Center + 3 x FSC-Leg3”**
- FSC90-Center + 3 x FSC-Leg3”**
- FSC60-Center + 3 x FSC-Leg3”**

Consulting project for SteelWall ISH GmbH,

Hamburg, March 2021

Dr. Christian Barth

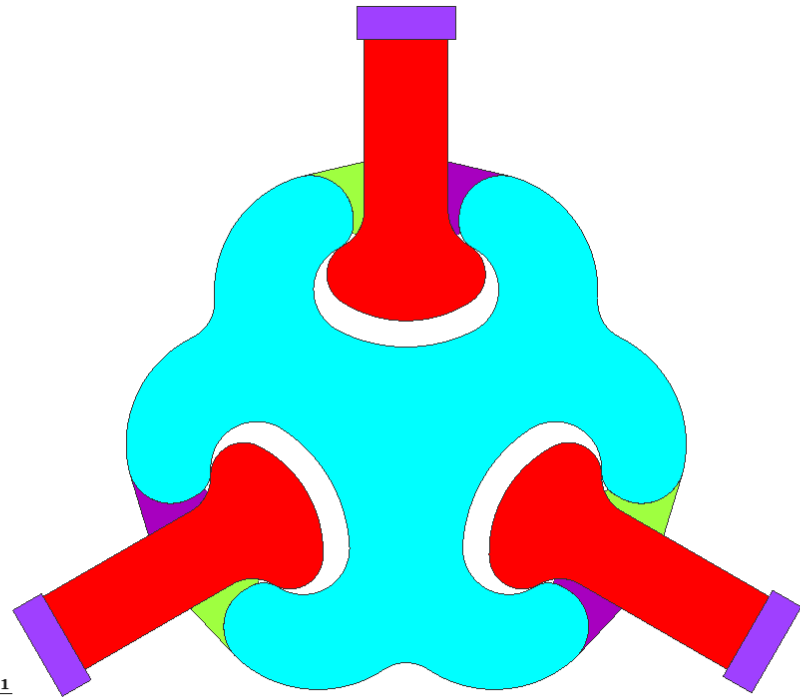
SteelWall[®]
Schlossprofile für Stahlspundwände

Problem Description

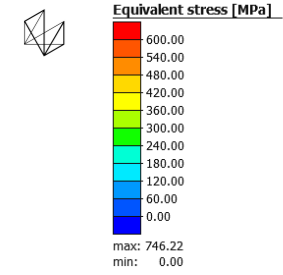
- A simulation study of ideal straight and symmetric tensile loading was conducted for Flat Sheet Centres (FSC) with 3 inch FSC legs. This analysis was done for
 - 120°, 90° and 60° configuration
 - with centre and legs fully welded
 - and all components and weld seams made of S355GP
- The simulations were set-up as 2d planar analysis assuming a plane strain state. The system was loaded using a uniform velocity of 1 mm/s of all 3 force application bodies (“dies”) and no movement between die and leg.
- High friction (Simufact automatic with scale factor 0.8) was assumed, however the system should not be sensitive to friction.
- The weld seams have been assumed to be “perfect” with the same material properties as the welded components and unlimited adhesion with them.
- The material data for S355MC, normalized, from the Simufact Forming material database was used and scaled according to the minimum yield stress specified for S355GP.

FSC120-Center + 3 x FSC-Leg3''

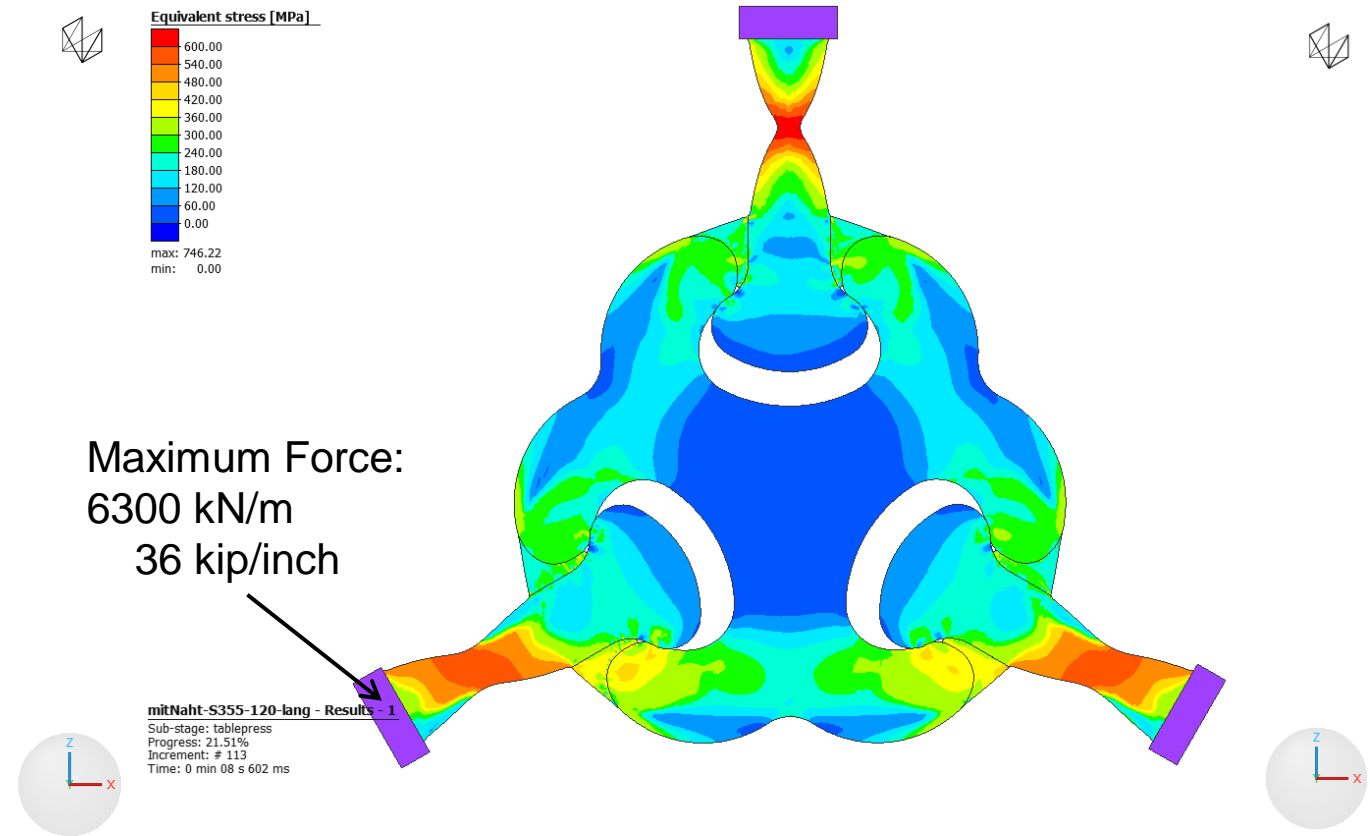
- Model legend**
- Mittelteil
 - NahtLinks
 - NahtLinks-2
 - NahtLinks-3
 - NahtRechts
 - NahtRechts-2
 - NahtRechts-3
 - einhaengteil-kurz
 - einhaengteil-kurz-2
 - einhaengteil-kurz-3
 - Einspannung
 - Einspannung-2
 - Einspannung-3



mitNaht-S355-120-lang - Results - 1
 Sub-stage: mitNaht-S355-120-lang
 Progress: 0.00%
 Increment: # 0
 Time: 0 min 00 s 000 ms



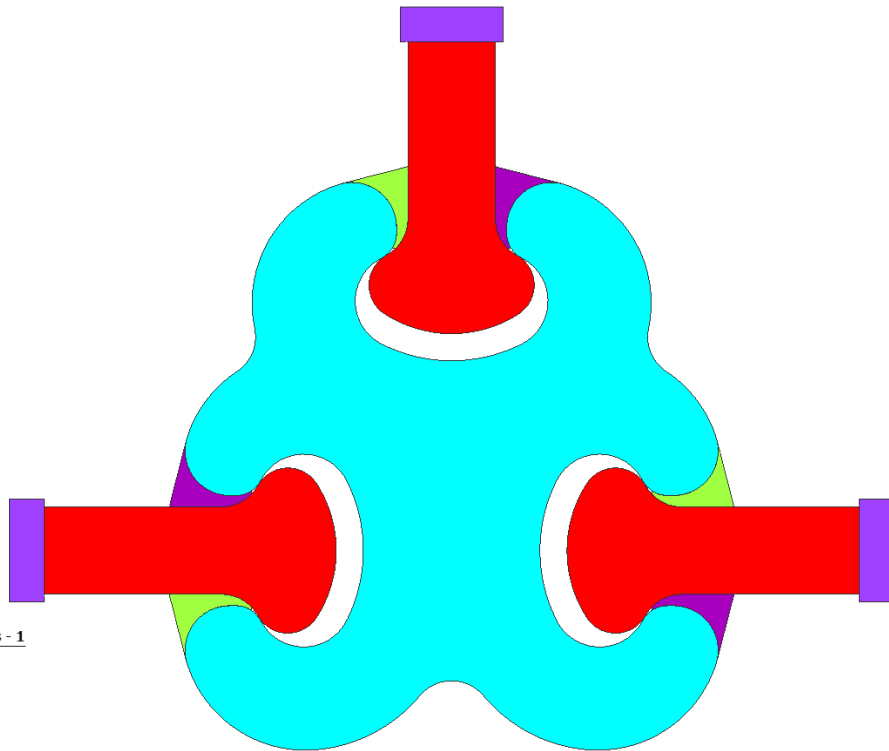
Maximum Force:
 6300 kN/m
 36 kip/inch



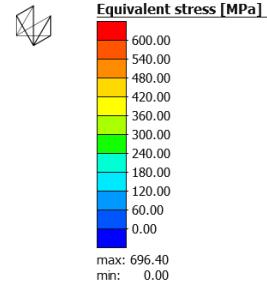
mitNaht-S355-120-lang - Results - 1
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 Progress: 21.51%
 Increment: # 113
 Time: 0 min 08 s 602 ms

FSC90-Center + 3 x FSC-Leg3''

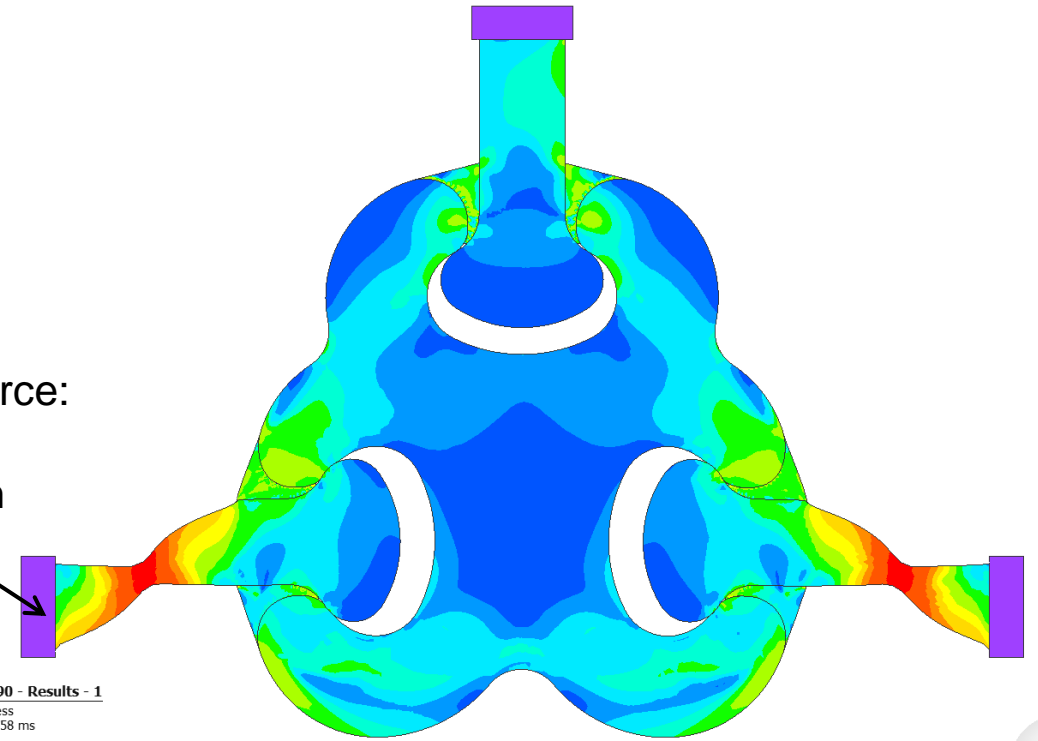
- Model legend**
- Mittelteil
 - NahtLinks
 - NahtLinks-2
 - NahtLinks-3
 - NahtRechts
 - NahtRechts-2
 - NahtRechts-3
 - einhaengtel-kurz
 - einhaengtel-kurz-2
 - einhaengtel-kurz-3
 - Entspannung
 - Entspannung-2
 - Entspannung-3



mitNaht-S355-90 - Results - 1
 Sub-stage: mitNaht-S355-90
 Time: 0 min 00 s 000 ms
 Increment: # 0
 Progress: 0.00%



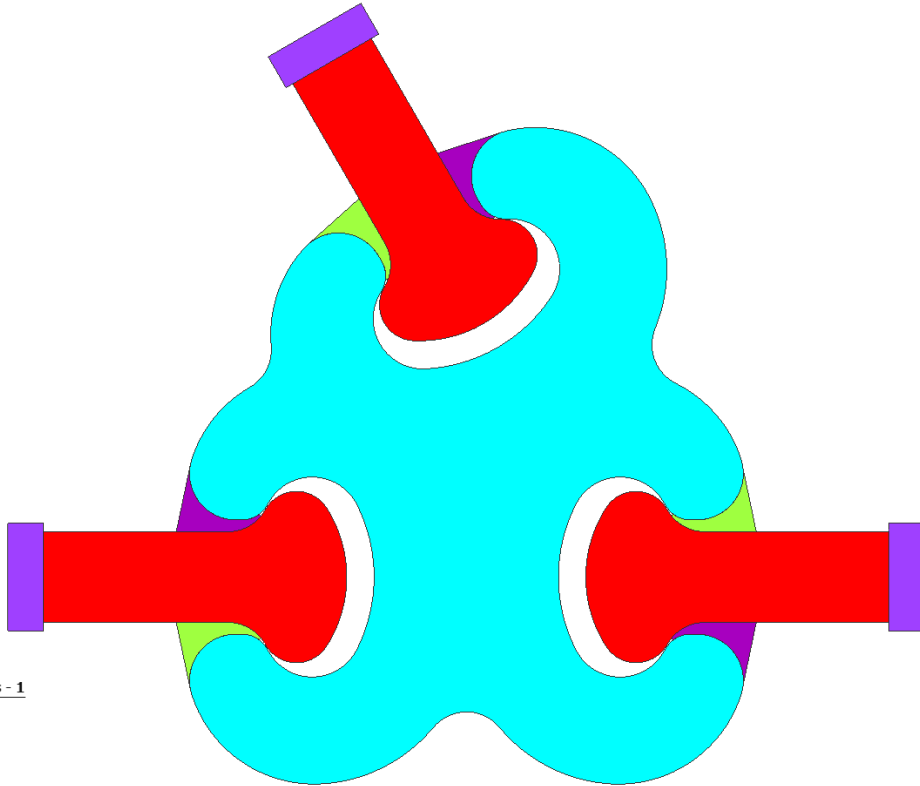
Maximum Force:
 6100 kN/m
 35 kip/inch



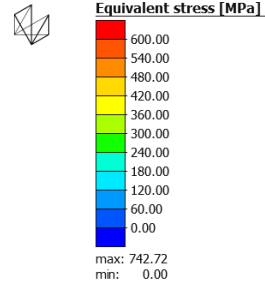
mitNaht-S355-90 - Results - 1
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 Increment: # 146
 Progress: 24.40%

FSC60-Center + 3 x FSC-Leg3''

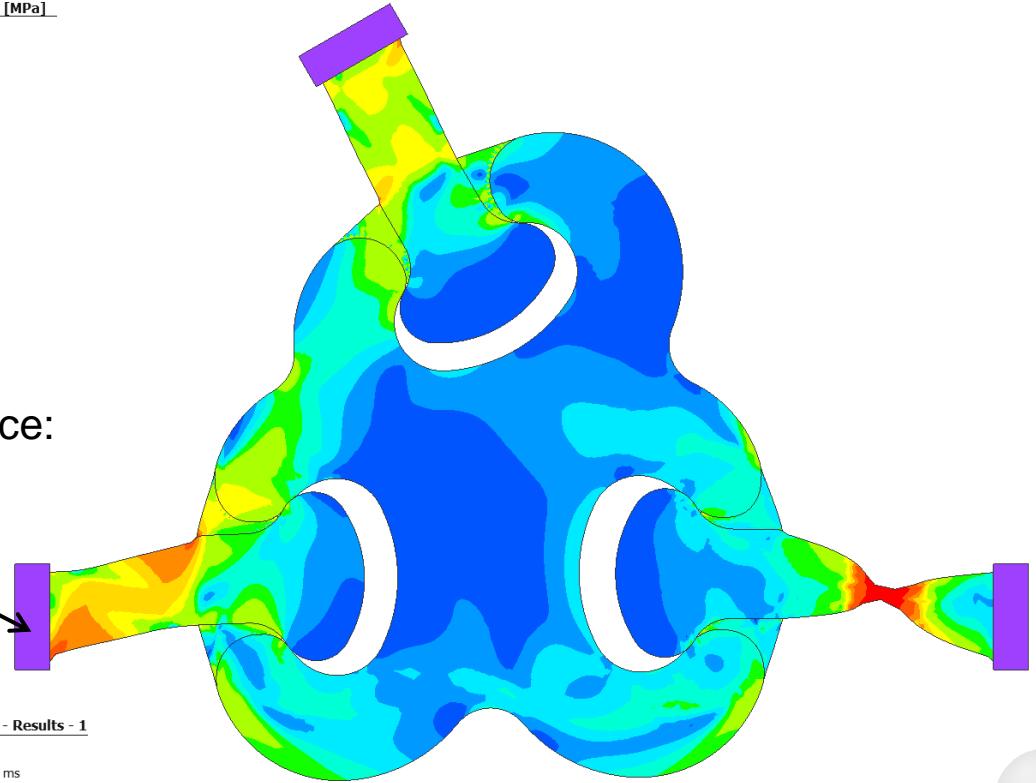
- Model legend**
- Mitteleil
 - NahtLinks
 - NahtLinks-2
 - NahtLinks-3
 - NahtRechts
 - NahtRechts-2
 - NahtRechts-3
 - einhaengteil-kurz
 - einhaengteil-kurz-2
 - einhaengteil-kurz-3
 - Einspannung
 - Einspannung-2
 - Einspannung-3



mitNaht-S355-60 - Results - 1
 Sub-stage: mitNaht-S355-60
 Progress: 0.00%
 Time: 0 min 00 s 000 ms
 Increment: # 0



Maximum Force:
 5600 kN/m
 32 kip/inch



mitNaht-S355-60 - Results - 1
 Sub-stage: tablepress
 Progress: 19.93%
 Time: 0 min 07 s 971 ms
 Increment: # 125