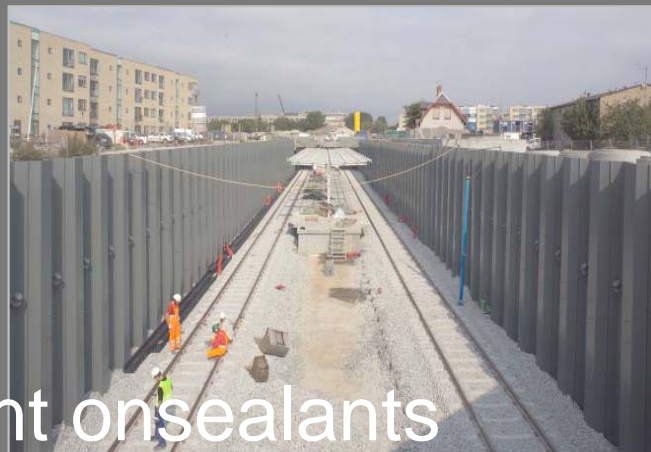




ArcelorMittal



Latest development on sealants



Steel Sheet Piles

June 2012

Sealing systems

- Introduction

- A sheet pile alone is completely water tight
- Leakage can only occur through the interlocks of sheet pile wall



- Depending on its application, a certain watertightness of the interlock can be required.



Sealing systems

- Required water tightness level is normally described in the specifications by:
 - A maximum accepted total horizontal discharge Q through the wall
 - Parameters (K , d) characterizing a slurry wall or
 - The inverse joint resistance parameter ρ and width b of a sheet pile (or equivalent)



Sealing Systems

- New AM Sealing Systems:
 - Average water tightness ($\rho \geq 6 \times 10^{-08}$ m/s) (1 Bar)
 - Beltan™Plus (available from June 2012)
 - High water tightness ($\rho \geq 3 \times 10^{-10}$ m/s) (2 Bar)
 - Roxan™PLus (available from Q3 2012)
 - Akila™ (available from Q4 2012)



Sealing Systems

- Beltan™ Plus
 - Single component black bituminous product
 - Pressure: max 1 bar
 - Applied at
 - ArcelorMittal subcontractors or
 - Delivered on the job sited



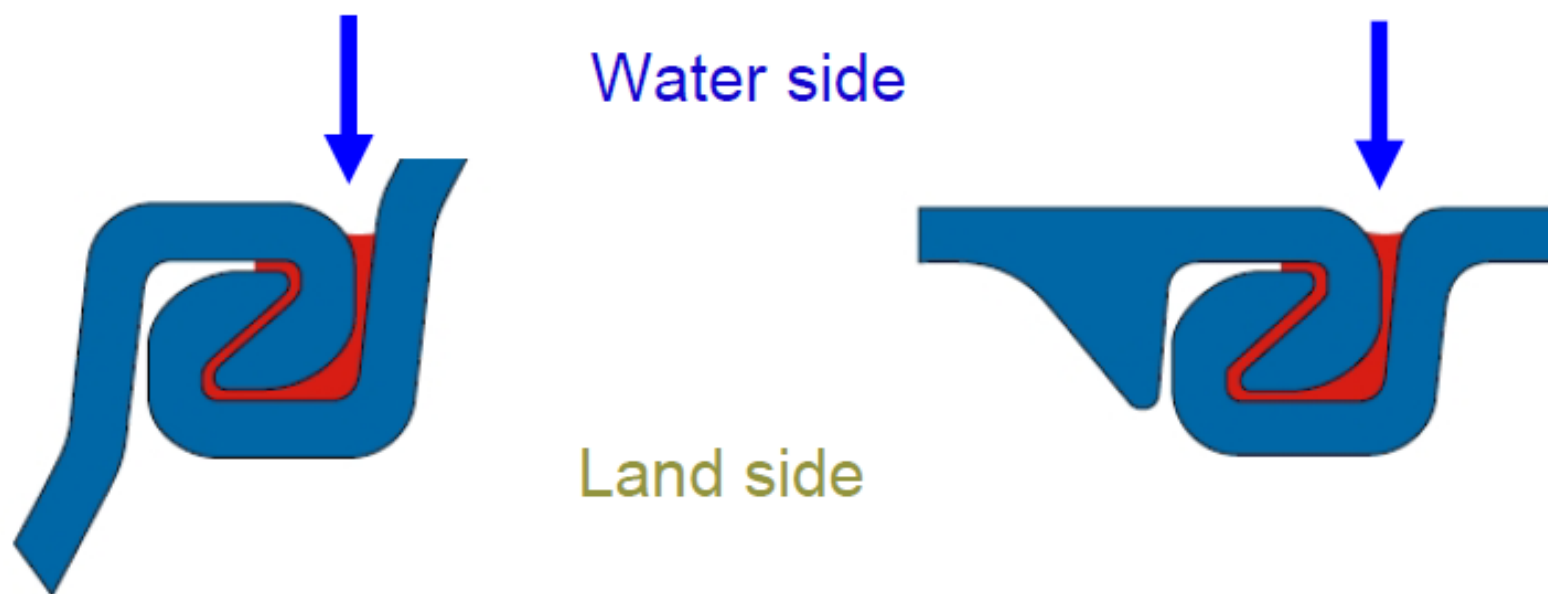
Sealing Systems

- Beltan™ Plus Application
 - SSP must be
 - Dry, grease and dust free
 - Surface T: -10°C to + 70°C
 - Sheet pile perfectly horizontal
 - Ends blocked with mastic
 - Hot poured in the interlock
 - Consumption
 - Free interlock : 0,3 l/m
 - Common interlock : 0,10 l/m



Sealing Systems

- Beltan™ Plus Application
 - Recommended position regarding water and land side





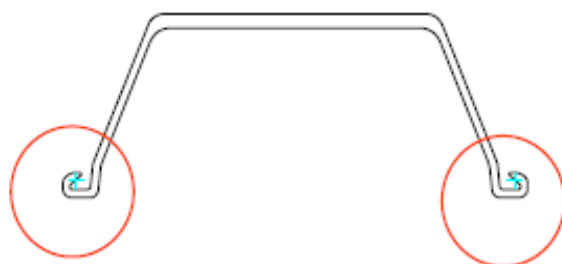
Sealing Systems

- Roxan™ Plus
 - 2 components
 - SikaSwell S-2
Waterswelling polyurethane (free interlock)
 - MSP 2 – two component sealant (center interlock)
 - Applied at
 - Arcelor Mittal subcontractors

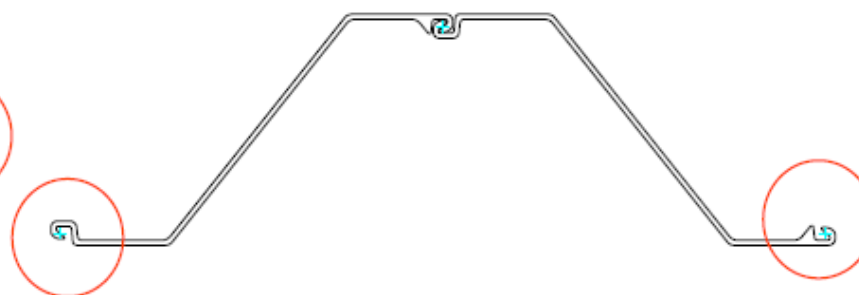


Sealing Systems

- Roxan™ Plus
 - Free interlock → SikaSwell S-2
 - Single Pile



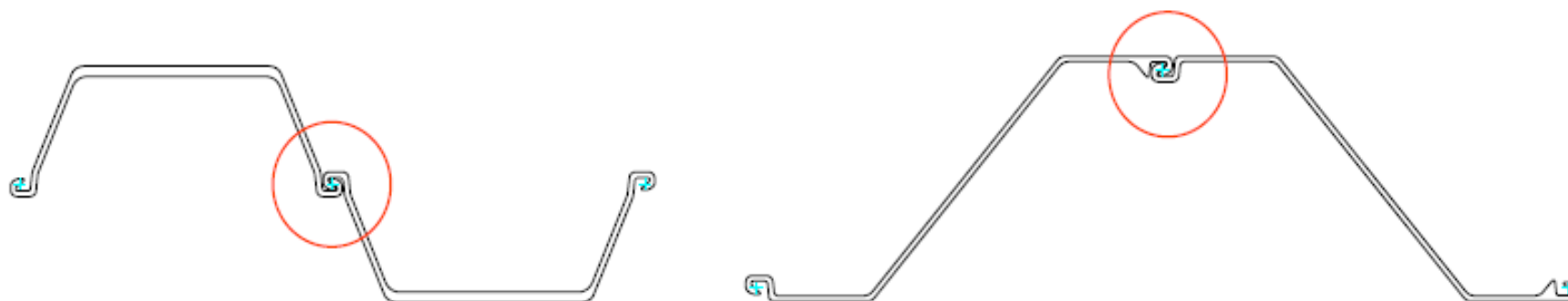
- Double Piles





Sealing Systems

- Roxan™ Plus
 - Intermediate interlock → MSP 2



Sealing Systems

- Roxan™ Plus
- Advantage:
 - MSP 2 in the center / common interlock is elastic
 - could be with SSP for combined walls (eg. only crimped at the top)



MSP-2 (white version)

R&D. Akila. Compression joint (2012)

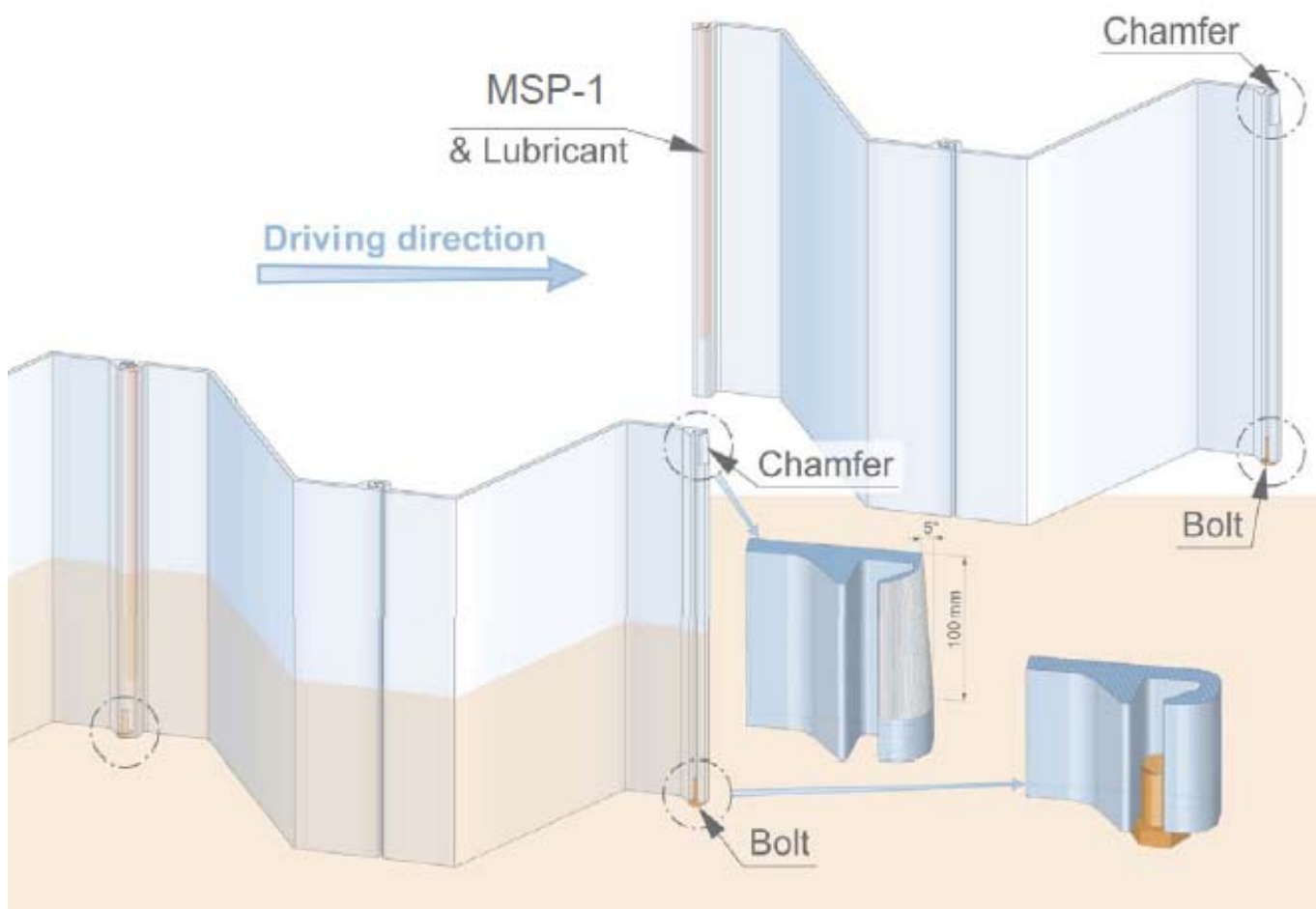
- new **environmentally friendly high performance sealant system**
- **compressive joint**
- **three sealing ‘lips’**. The product is mechanically extruded into the sheet pile interlocks
- **silane modified polymers** (MS-Polymers)
- resists up to 30 m of water pressure (3 bars)
- can be used in contact with groundwater



	ρ_m (m/s)	
water pressure	200 kPa	300 kPa
single piles (MSP-1)	4.9×10^{-11}	8.6×10^{-11}
double piles (MSP-1 & MSP-2)	3.3×10^{-11}	4.7×10^{-11}

Sealing Systems

- Akila™ - Installation





Sealing Systems

- Akila™ - Installation
 - Grease (NOT soap) applied with a brush to help gliding and reduce friction during driving





Sealing Systems

- General remarks:
 - Especially for Roxan TM Plus driving directions have to be respected
 - ArcelorMittal CRPS assist with installation drawings
 - For Roxan TM Plus and Akila TM installation recommendations have to be considered.



Sealing Systems

- Thank you for your attention
 - Question and Answer