Applications and customer benefits toughcore®

Peter Wieser, Wolfgang Leeb, Regina Leidinger

4th InnoTech Partner Event, 9 June 2016, Linz

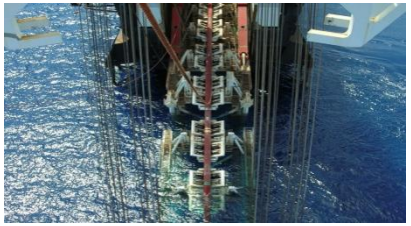
voestalpine
ONE STEP AHEAD.

Possible Applications and Benefits …








… ?

Application Matrix and Customer Benefit

	Application	Offshore Platforms	Linepipe		Energy storage and transportation		Construction and machinery industry		Motivation				
	Product	**Offshore Steel**	**Linepipe Steel**	**Clad Linepipe**	**Penstock**	**Ni-Steel**	**High-strengths Steel**	**Wear-resistant Steel**	**Safety**	**Productivity**	**Weldability**	**Cost reduction**	**Extreme Regions**
Critical - thickness related properties	Higher CVN toughness on the plate	•	•	•	•	•	•	•	•	•	•	•	•
	Higher CVN toughness in the HAZ	•	•	•	•		•	•	•	•		•	•
	Higher CTOD values	•	•	•	•				•				•
	Higher Battelle values		•						•				•

According to relevant standards

As-delivered condition

Standard	Steel grade	As-delivered condition
API 5L	**X80**	**TMCP toughcore®**

Best weldability

Best weldability

- Finest microstructure of the base material
- Increase the safety level of the welded structure
- HAZ remains fine grained and tough even after welding with higher heat input to still meet existing requirements.
- Lower cycle time for welding opens new potential - costs can be reduced

Exploration of extreme regions

Applications can be realized at lower temperatures

- Significantly lowered transition temperature
- No brittle fracture
- Frontier projects can be realized

Protect the offshore structure

Protect the offshore structure

- Extraordinary high requirements on material toughness and strain in the ship collision zone or for ice belts.

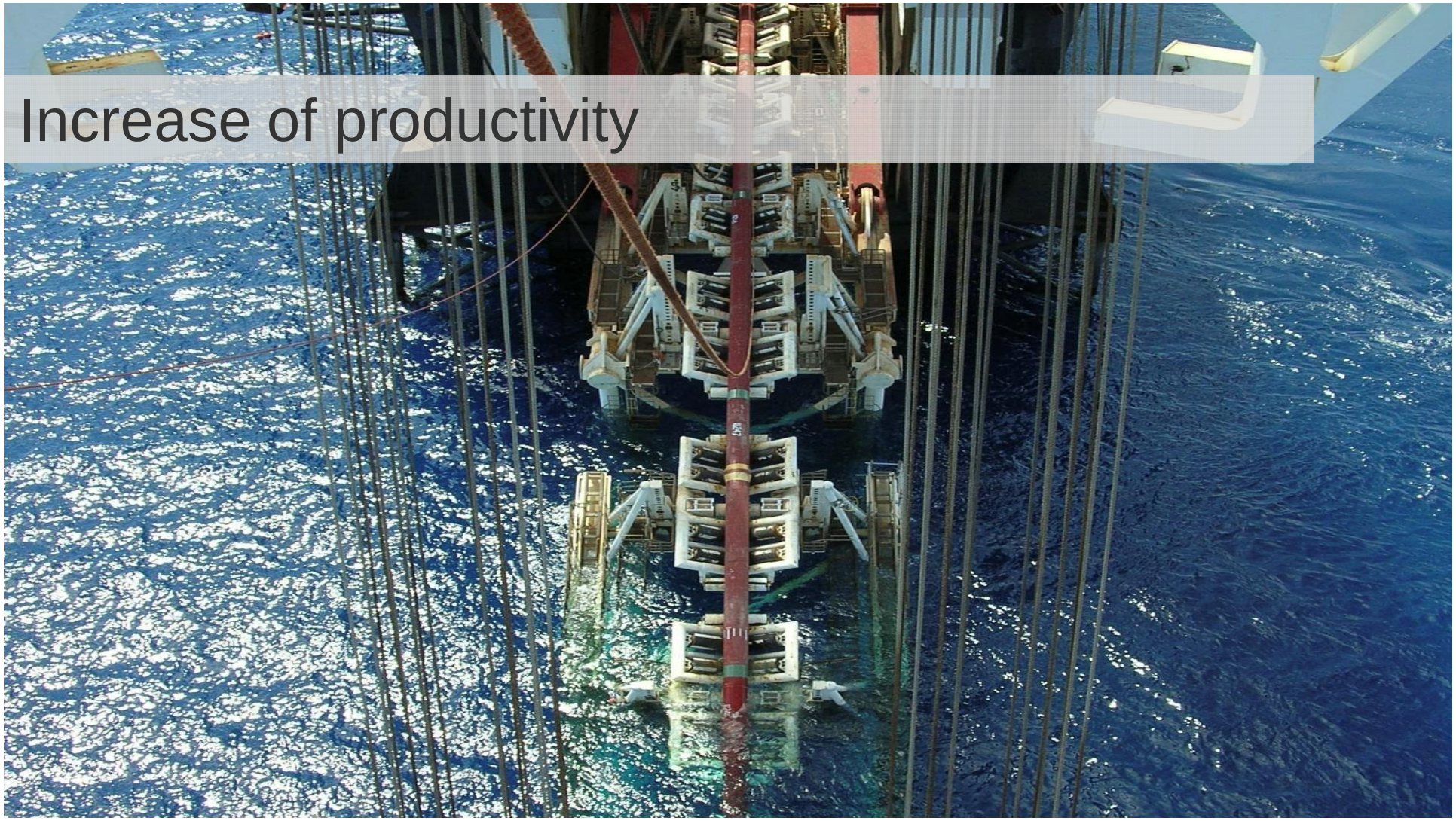
- toughcore® with extreme high toughness at low temperatures and a high wall thickness enhance the safety.

High-strength design

Cost reduction by lightweight design

- High-strength available in a higher thickness range
- Reduce wall thickness and weight for existing requirements
- Save costs for manufacturing, transportation and installation

Increase of productivity



Increase of productivity

- Higher wall thickness leading to a higher permissible buckling pressure and a lower laying depth
- Pipelines or riser can be installed in deeper waters or with larger diameter at the same depth
- Buckle arrestors with superior mechanical properties

Increased safety of pipelines

Pipelines with higher safety

- Crack arrestor made of toughcore® arrest a crack reliable even at very low temperature.
- Slug-catcher can be designed with bigger dimension for higher flow rates and withstand higher pressure peaks

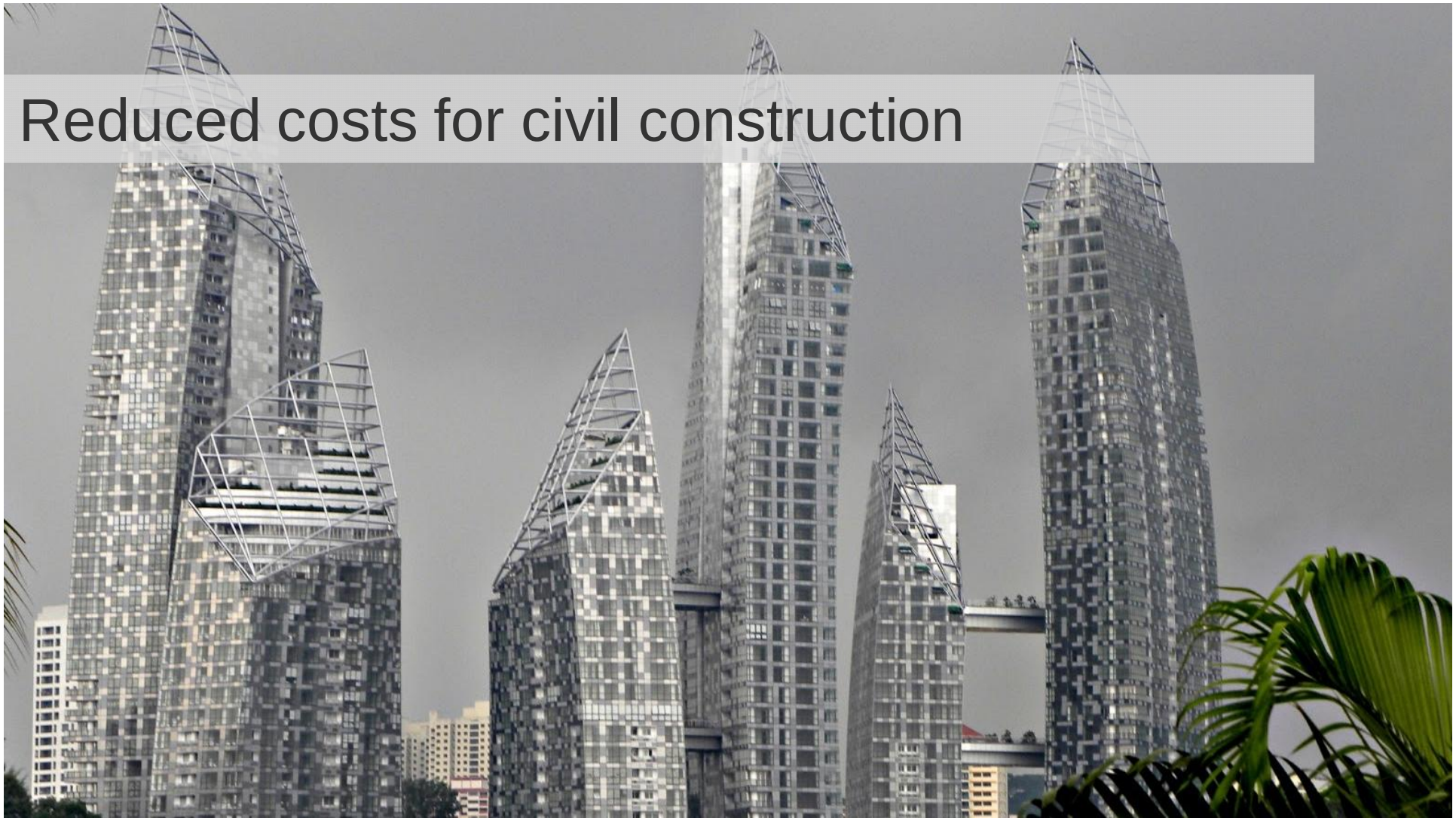
Reduced costs for Nickel application

Cost reduction of Ni – Steel for LNG & LPG

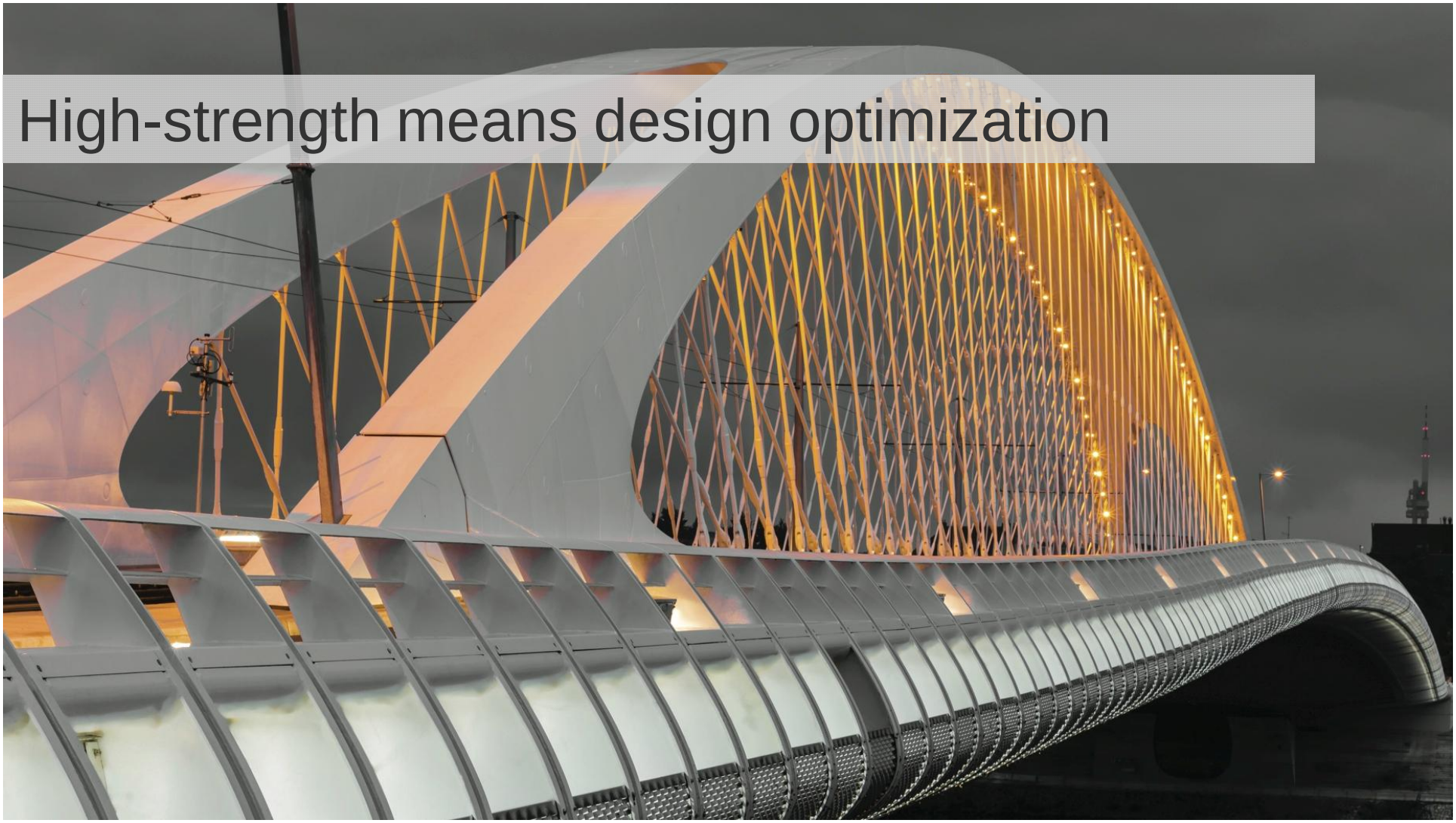
- 3,5% Ni-steel will be substituted by toughcore®
- Reduced Ni-content for 5 and 9 % Nickel by using toughcore® technology
- Reduce expenses for Ni-steel

Complete thickness range for penstocks

Reduced costs for civil construction



High-strength means design optimization



Optimization of design of individual components

- Joints faces extraordinary requirements e.g. stress / buckling / yield strength / toughness.
- High-strength grades with sufficient wall thickness and excellent toughness enables the design optimization

QT can now be substituted by TMCP-plates

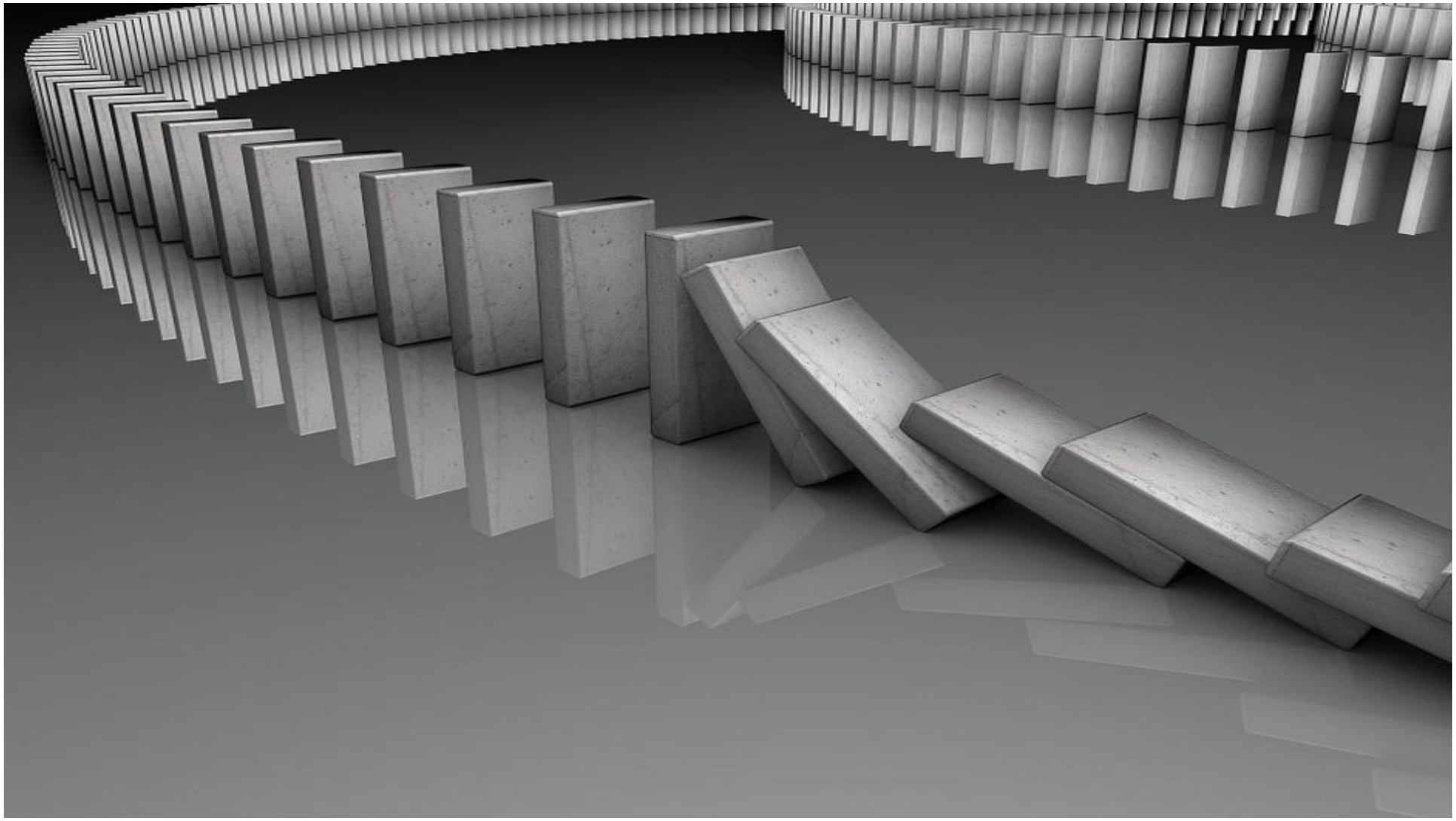
QT can now be substituted by TMCP-plates

- High-strength TMCP plates available with higher thickness and excellent toughness
- Where QT was required, now toughcore® TMCP can be used
- Lower sensitivity of cold cracking

Trucks and mining equipment

Trucks and mining equipment

- Even possible for wear-resistant plates
- Trucks and mining equipment in low temperature regions



voestalpine Grobblech

YOUR partner for innovation and technology

toughcore®