## Impressions from the SPE Sand Control Forum in Galveston

The SPE forum “Sand Control in Next-Generation Brownfields and Depleted Reservoirs – A Future-Forward Approach” took place from December 8 to December 11 in Galveston, Texas. It was a great event to keep in touch with the latest industry trends and local Golf of America challenges. As a silver sponsor Con-slot SCREENs was present with a representative and also presented a poster on the groundbreaking FormationLink-Ceramic® Technology.

The focus of this forum was sand control completions in brownfield reservoirs mainly offshore. As greenfield projects become less, production from existing brownfield wells and new wells in brownfields grows in importance. The forum started with a general overlook session on current challenges, followed by open-hole completion challenges and potential solutions. Day two started with through tubing potential solutions and looked at cased hole completions in the afternoon. The entire third day was dedicated to technical limits of sand control techniques and the last session on the fourth day was on completion challenges in depleted reservoirs.

Beyond a lot of very deep technical discussions on specific topics, one conversation came up multiple times throughout the three and a half days: how can innovation be fostered? Following some discussions about incentives from operators to reduce risks for service companies it was concluded that a lot of new and groundbreaking technologies are not coming from the big fully integrated service companies. Instead, independent companies are willing to take the risk of developing a groundbreaking product and bring it to market – such as the FormationLink-Ceramic® Sand Screen.

# Development and Application of Ceramic Coated Wire Wrapped Screens for Through Tubing Installations

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**How:** Through tubing remedial installations have become more and more popular to continue production from aging wells with starting sanding issues or failed primary sand control. Due to the limited inflow area of the screens and low pressure, the insitu flow rates and velocities are often high. This leads to an increased risk of erosion of the screens.

**Why:** In order to increase the erosion resistance of wire wrapped screens a rigorous research program on plasma spraying technologies has been carried out. Laboratory tests and qualifications were utilized to reach initial field readiness. Afterwards the experience of almost 50 deployments in south east Asia along with external validation of the erosion resistance by Universiti Teknologi Petronas (UTP) have led to further understanding of failure mechanisms of through tubing sand screens. This knowledge has been integrated into the further development of a second generation of plasma sprayed ceramic coating. The result is a wire wrapped screen with a ceramic coating that can withstand challenging well conditions with high flow rates and sand production. The screens haven been used to bring idle wells back to production and continue production from wells with sand production.

## Plasma Spraying Technology

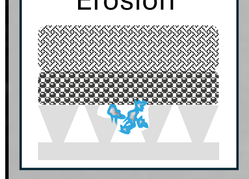
The screens are coated using the method of thermal spraying. This process uses a hot plasma jet to melt powdery materials and apply them to a solid surface. The molten particles solidify on the surface and form a hard coating with little porosity. The coating steps are:

1. **Sand Blasting**
2. **Plasma sprayed bonding layer**
3. **Plasma sprayed main ceramic layer**
4. **Liquid Sealer**

## Laboratory Qualifications

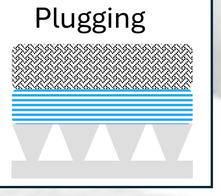
Laboratory investigations of all failure mechanisms were carried out. These included:

Erosion



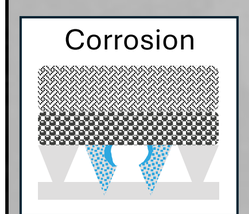
- Slurry (liquid) and pressurized air (gas) erosion was tested
- Tested up to 60 ft/s for liquids
- Qualified up 150 ft/s for gas

Plugging



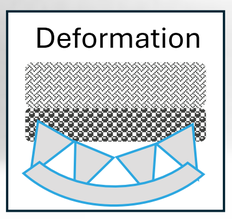
- Sand Retention Tests conducted (see [2] for details)
- No difference between coated and uncoated screens

Corrosion



- Long term corrosion resistance tests
- $CO_2$ atmosphere and high salinity brine
- Resistant to short term exposure to hydrochloric acid

Deformation

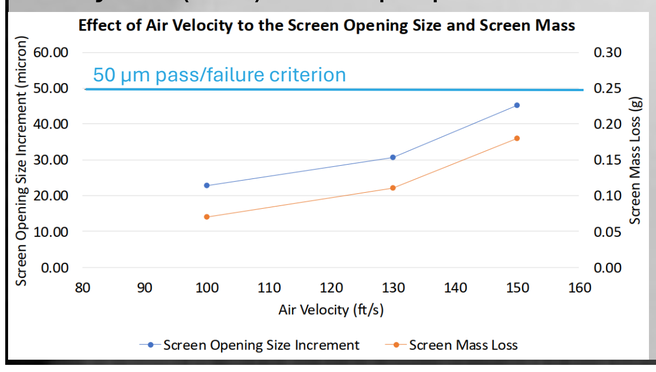


- Torsion, bending and tension tests performed
- Coating doesn't change the mechanical properties of the screen
- No parting of coating and screen under high deformation

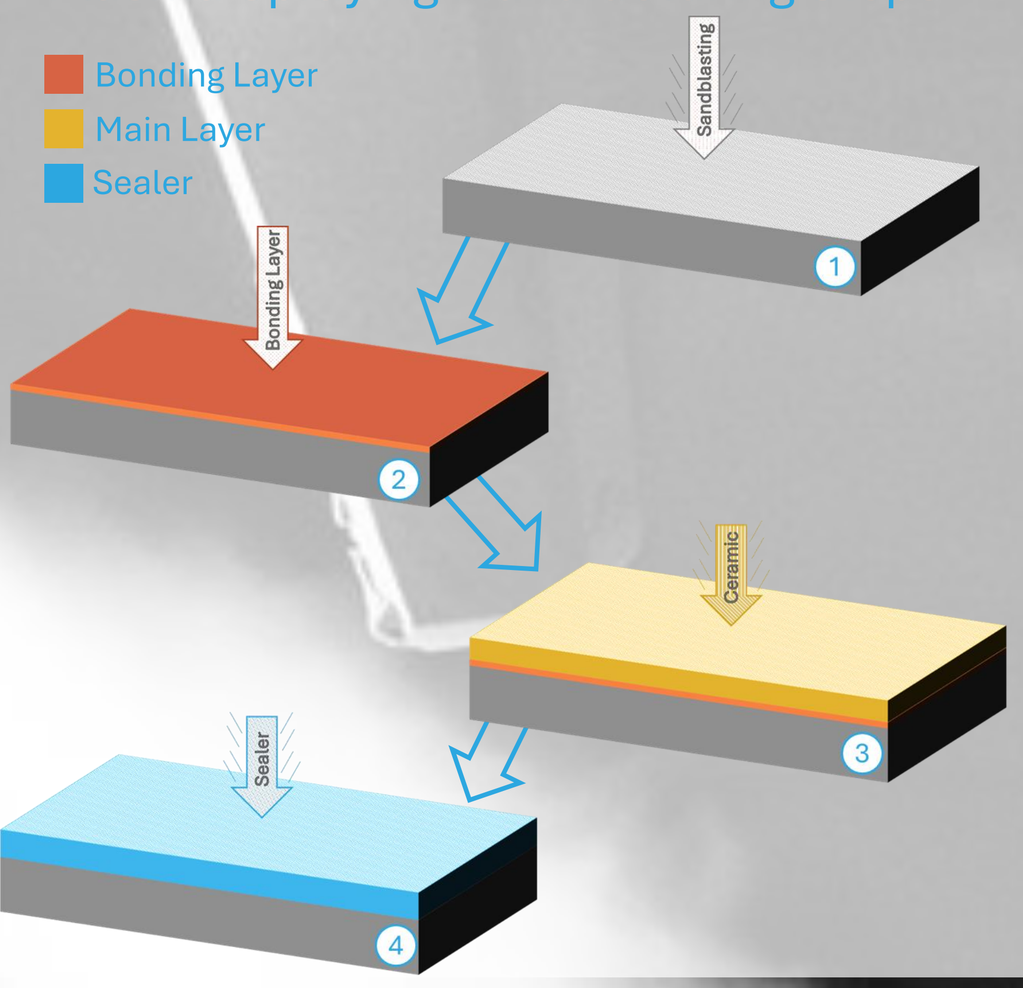
## Gas-Sand-Erosion Testing

The resistance against erosion has been investigated on an internal test stand during the development and optimization of the coating. The set up is derived from the set ups describe in SPE-191942 [3]. It uses a pressurized air stream to accelerate particles onto screen samples. The erosion is measured by mass loss and slot size increase. The relationship between airflow and particle size was calibrated using a high-speed camera.

After internal qualification, the final coating was sent to an external lab at Universiti Teknologi Petronas Department of Petroleum Engineering in Malaysia (UTP). The purpose of the external tests was to validate the internal results and to provide independent proof of the erosion resistance. Based on the failure criterion of 50 µm of slot size increase over the testing period the results qualify the screens up to a flow velocity of 150 ft/s.




## Plasma Spraying Manufacturing Steps

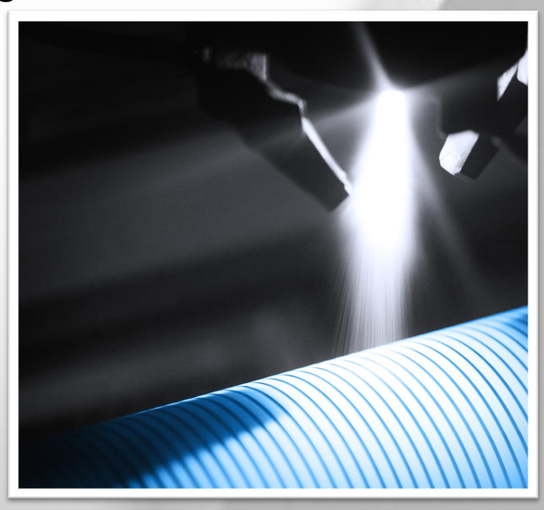



## Field Application Results

**First Application:** The first Ceramic Coated Wire Wrapped Screen was installed in 2020 (see SPE-210377 [4]) proving field readiness and increased erosion resistance. As of December 2025, almost 50 oil and gas wells from different operators have been equipped.

**Continuous Success:** The screens were deployed with different methods such as nipples plug or lock mandrel via slickline or lock mandrel via coiled tubing. Initially, screens were retrieved to review the condition prior to failure and establish an expected lifetime. Later some wells were produced for several years until sand was produced to surface.

**100% Successful Retrieval:** All attempts to retrieve the through tubing assembly were successful. All screens were pulled in total and without parting. Several tear downs in cooperation with operators were conducted. The tear downs were used to gain deeper understanding about the potential failure mechanisms of ceramic coated screens and through tubing screens in general.



Plasma Coating

Coated Screen

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[1] Ochmann, Lukas , et.al. "Development of Plasma Sprayed Coatings to Improve the Erosion Resistance of Wire Wrapped Screens." International Petroleum Technology Conference, Virtual, March 2021. doi: https://doi.org/10.2523/IPTC-21158-MS
[2] Ochmann, Lukas, et.al., "Development of a Sand Retention Test Set-Up Focussing on the Measurement of Produced Sand," *OIL GAS European Magazine*, no. 2, pp. 25–32, 2021, https://doi.org/10.19225/210609
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[4] Yeap, Wei Jian, et.al. "Pioneering Application of Plasma Spray Coatings to Improve the Erosion Resistance of Rod Based Wedge Wire Screen." SPE Annual Technical Conference and Exhibition, Houston, Texas, USA, October 2022. doi: https://doi.org/10.2118/210377-MS