A unique & **cost-effective** tool to help you make **better decisions** regarding your pipelines and structures.

FIGS® CP SURVEY

BY FORCE TECHNOLOGY NORWAY

FIGS® CP SURVEY - BENEFITS

REDUCE COST

> Accurate and lean cathodic protection systems

> No excavation and no production stops

> Optimised retrofit and service life extension

> Faster inspections

> Qualified decisions based on accurate predictions

INCREASE SAFETY

> Reduced risk of leakage

> Reduced HSE risk by eliminating use of divers

PREDICT RISK

> Accurate estimate of current condition and future development

> Improved planning

FIGS® CP SURVEY - EXPLAINED

- A FiGS® CP survey maps the electric field (**strength and direction**), set up by the cathodic protection system
- On both **exposed and buried pipelines** and structures, it provides an accurate condition assessment and detects even minor coating damages
- Its design allows for accurate measurements with a resolution and detection level beyond any other field gradient sensor available in the market
- Combined with CP modelling, you achive precise models, enabling **significantly improved predictions**

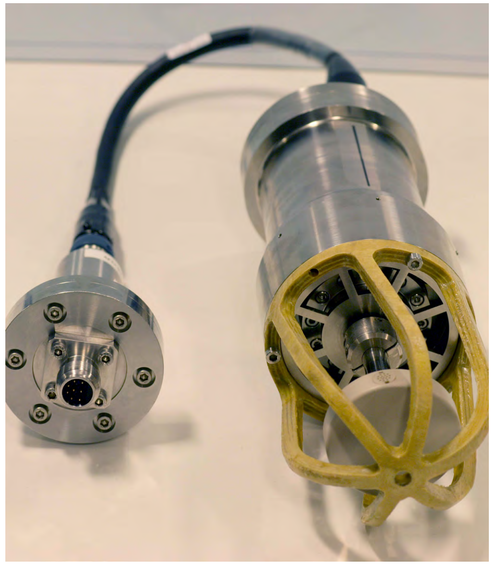
A unique & **cost-effective** tool to help you make **better decisions** regarding your pipelines and structures.

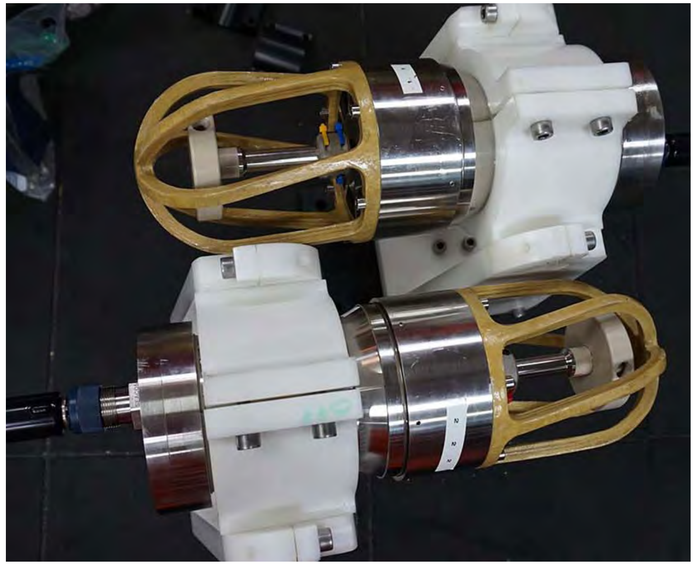
FIGS® CP SURVEY

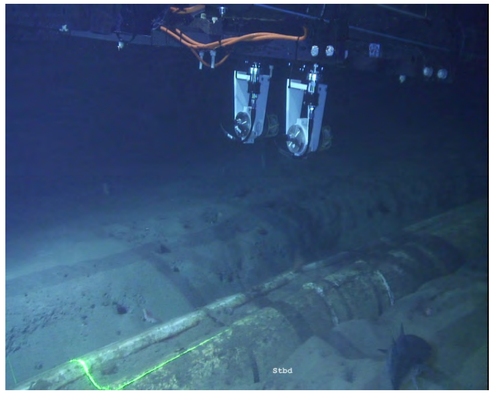
Some of the benefits:

- Optimised CP retrofitting, offering substantial cost savings
- Accurate service life estimations
- Eliminates the use of divers - thereby reducing HSE risk
- Kilometers are surveyed accurately and quick
- Eliminates the need for excavation or production stops
- One tool for all your subsea assets - from shallow to ultra-deep water
- From reactive to proactive decisions - predictability

FIGS® CP SURVEY







FIGS® CP SURVEY - WHEN & WHY

Before operation, a baseline FiGS® CP survey should be conducted to (DNV-RP-F116)**:**

> Look for any damage in the coating and the CP system caused during installation

> Determine the potential along the pipeline and current

> Determine the output of galvanic anodes (baseline for later surveys)

During operation, FiGS® CP survey should be conducted to verify**:**

> CP system failures

> Lack of CP (loss of electrical continuity)

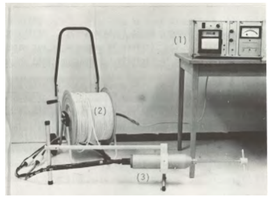
> Excessive anode consumption

> Coating damages

A well working CP (cathodic protection) system is essential to protect subsea structures and pipelines against corrosion.

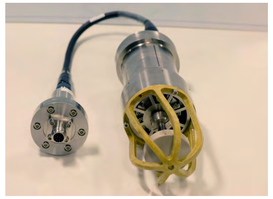
HISTORY OF FIGS®

1979-1981:



CPPR, Developed in Trondheim by CorrOcean, Roe Strømmen

2007-2013:



FiGS® developed with partners

2015:

Statoil approval TRL7 - approved for multi use

APPLICATION AREAS

A FiGS® CP survey can be used on:

- Offshore jacket structures
- Subsea pipelines - baseline survey & retrofit
- In-field structures
- Offshore wind turbines
- Offshore floating platforms - flexible risers/pipelines

OFFSHORE JACKET STRUCTURES

Objective:

- Measure current density to find the actual requirements for cathodic protection
- Check performance of the CP system (anode current and wastage)

Findings/results in case:

- Significant amount of inactive/damaged anodes, which influence the life expectancy of the CP system
- Steel current densities much lower than the values used in the current CP retrofit design
- Extend the life of the current CP system and postpone the retrofit a few years, offering substantial cost savings for our client
- Clients have claimed savings of USD 10 M, nearly 65% of the original estimate using our processed data, combined with CP modelling instead of design code

SUBSEA PIPELINES - BASELINE SURVEY

Objective:

- Look for any damage to the coating and the CP system caused by installation
- Verification of a functioning CP system

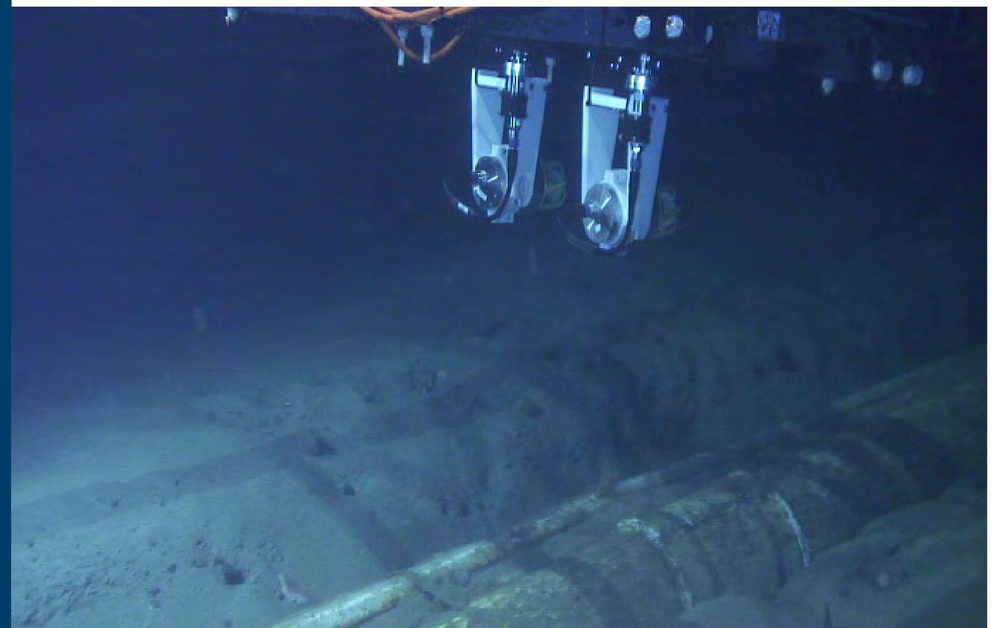
Findings/results in case:

- Surveys revealed sacrificial anode banks not working as expected and corrective measures had to be made
- Surveys DEH pipelines revealed threats to the CP system in the long run

SUBSEA PIPELINES - RETROFIT SURVEY

Objective:

- Measure the current density to find the actual requirements for cathodic protection
- Check the performance of the CP system (anode current and wastage)



Findings/results case:

- The survey found buried anodes believed to be depleted still very active
- Coating breakdown was less than the standards expected
- Accurate data for CP retrofit design optimisation
- Clients typically reduce retrofit requirements by 50%

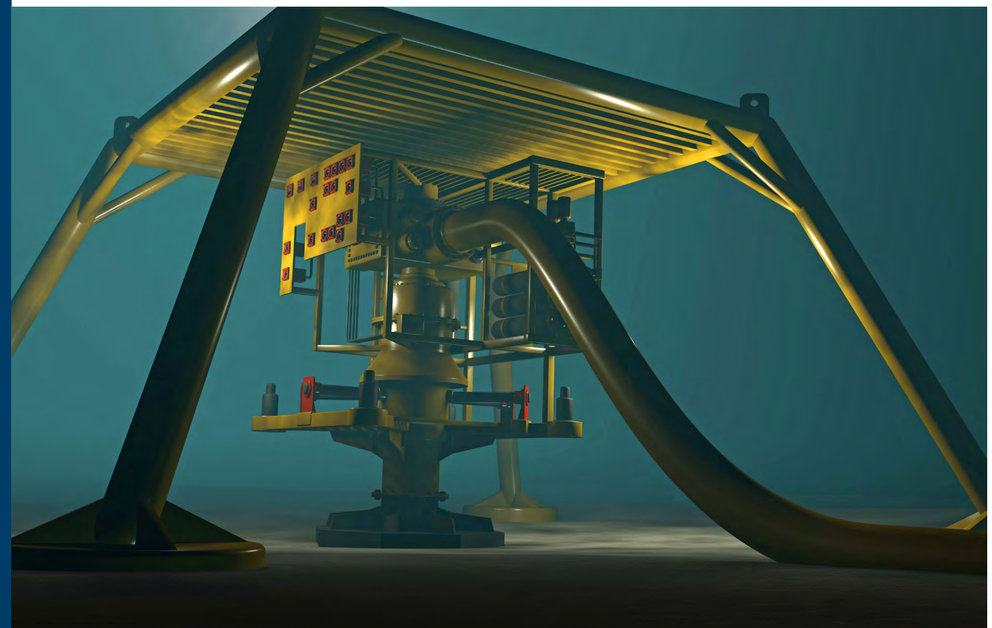
IN-FIELD STRUCTURES

Objective:

> 3D Inspection of CP system

> Establish potential plot of the structure to assess CP protection level

> Quantify drain to connected structures



Findings/results in case:

> We found significant amounts current flowing into the structure (SSIV), indicating that the anodes were depleted and that protection was offered by the anodes of the connected pipeline.

- Visual inspection confirmed anodes on SSIV were depleted.

> We found significant amounts current flowing out of the X-mas tree down toward the well casing

- We were able to quantify the current drain to well casing enabling us to calculate remaining life of the CP system on the X-mas Tree

OFFSHORE WIND TURBINES

Objective:

> Survey of external CP system

> Determine current distribution, which is often an issue for monopiles

Findings/results in case:

> The monopiles were found to be polarized and well protected, despite the high water resistivity

> We were also able to quantify the current flow to the buried parts of the monopile

> Client got confirmation of a well protected structure and a basis for future inspection plans

OFFSHORE FLOATING PLATFORMS - FLEXIBLES

Objective:

> Look for damages in outer shield flexibles and risers

Findings/results in case:

> FiGS® easily detected a minor tear in the outer shield

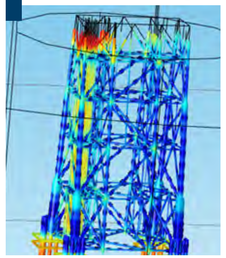
> By combining data with modelling, we were also able to estimate the size of the damage/ delamination

> Client got valuable data for monitoring the development of the damage

FORCE TECHNOLOGY NORWAY - AREAS OF EXPERTISE

Structural monitoring

Structural engineering



Integrity management

Training & courses

Welding technology

Inspection & testing

Corrosion & materials

Certification of personnel

CONTACT

Thank you for your interest in this fantastic solution!

Please feel free to contact us by using this e-mail

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