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ANKObluepix

Dimensional Survey Company

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- **AnkoBluepix was founded in 2016 by experienced engineers, each a specialist within different segments of the survey business. Even though AnkoBluepix is a young company – Our Mother company Anko AS was established back in 1975. AnkoBluepix has a broad in-house survey competence with the goal to be a one-stop shop for our clients. Together we will find a survey method that gives you the best results within your specifications such as accuracy, time efficiency and price.**

- As-built survey of any structure
- Navigation system control (Heading, Pitch and Roll)
- DGNSS Health Check
- RGPS Health Check
- 3D Laser scanning
- ATOS
- ROV survey
- Vessel survey
- Rig survey
- BlueEye – Subsea Photogrammetry
- Offshore Installation
- Offshore Windmills
- Subsea structure offset survey and Calibration
- High precision measurements
- Reel survey
- Survey Support during Multibeam installation
- Establish Global Coordinate points
- Survey management and consultancy
- Development of special survey solutions for your projects
- Drone Survey

AnkoBluepix works worldwide

With Office in Stavanger, Bergen, Harstad and Las Palmas

Vessel Survey

- On a vessel it is a great advantage to know the as-built and as-installed position and alignment of all items utilized for operating the vessel. For some items it is even a necessity.
- Such items might be Cranes, Moon Pool, Tower, Launch Systems, inclination of helideck, structures on deck, Taut Wires, etc. Others are the positioning/navigation systems sensors like Antennae, Motion sensors and sensors at the underside of the vessel like HPR poles and Multi Beams as well as other transducers/transponders.
- In order to know the position and alignment angles of all items in relationship to each other, one common coordinate reference system must be established on board the vessel. This is a local system made by one axis pointing forward, along or parallel to vessel centerline, one axis pointing towards starboard, one axis pointing upwards, a defined zero-point (CRP, coordinate/common reference point) and a defined reference plane. The three axis are 90 degrees to each other. The CRP can be anywhere but it should be located on a point which enable it to be picked out from the GA drawing of the vessel. The reference plane can be the best fit plane on main deck or a plane best fitted through the draft marks on the hull. The reference system should also be secured for future use by markers on the main structure.
- By means of a Totalstation, the offsets and installation angles of each item can be measured and tied into the coordinate reference system in order to have all positions and angles related to each other.
- Finally, a written report consisting of descriptions, definitions, procedure, photos and coordinated tabular/sketches of all points of interest should be issued.
- Survey by use of Totalstation is a cost- and time efficient solution to your specific needs.

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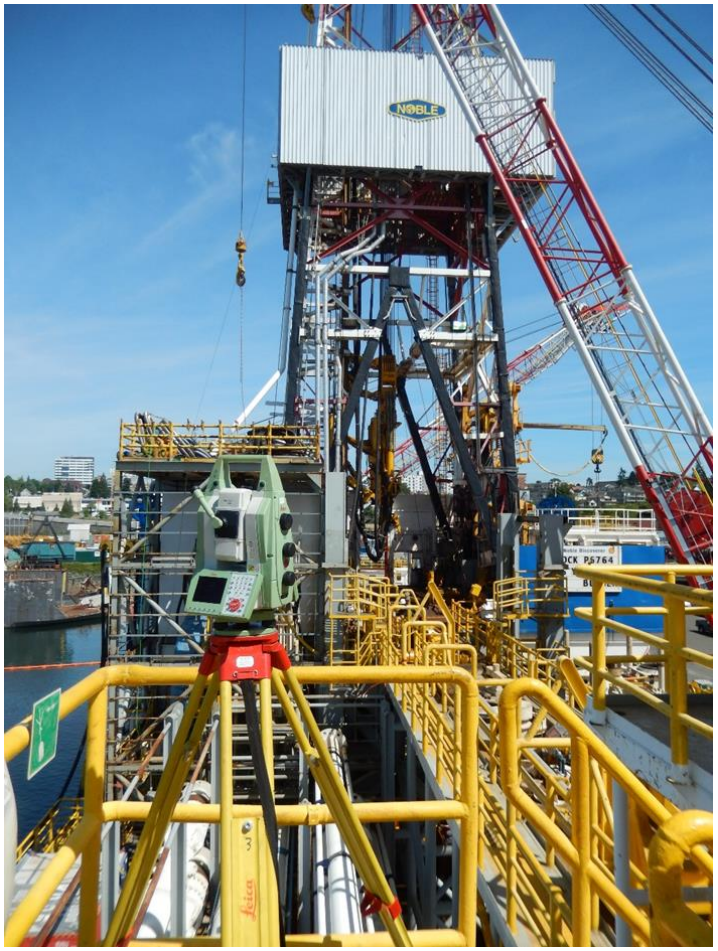
ROV

- On a ROV it is very much the same principles as on a vessel, but it is often the main frame that is used as axis and plane reference. Some multi purpose ROV's have survey frames that are mounted and dismounted, then all axis and plane references are located to this particular frame.
- By means of a Totalstation, the offsets and installation angles of each item can be measured and tied into the coordinate reference system in order to have all positions and angles related to each other.
- Finally, a written report consisting of descriptions, definitions, procedure, photos and coordinated tabular/sketches of all points of interest are issued.

Rigs and Drillships

- For Drillships it is very much the same principles and survey tasks as for other vessels.
- For Rigs it is normally the centre lines between the corner columns that are used for establishing the reference axis. Centre turntable (centre well) is often used as CRP.
- For both, the most commonly surveyed items in addition to the DP systems sensors is the drilling system. This is often position and alignment of the BOP in storage/resting location as well as the drilling system consisting of guide rails and drilling machinery, dolly etc.
- A typical survey job is therefore to measure and determine the guide rails straightness and the drill string alignment between top drive or crown block and centre turntable on drillfloor.
- Out of straightness of each guide rail relative to each other as well as out of theoretical dimensions between the rails is mapped. Then adjustments are carried out by the rig personnel and afterwards a new alignment survey is performed in order to verify correct adjustments.



Navigation System Control

The main purpose with Navigation System Control is to check that the sensors are in good working order. That there are no "drift" in the sensors. That the software input is correct and to adjust for the installation angles.

- **Vessel**
  With our specially designed software we can control all Attitude sensors and Gyro compasses. Our personnel have many years experience with this work. This is a safe way to control that the right installation angles (C-O values) has been entered into the software and that the different sensors show the same output value. AnkoBluepix will install their equipment onboard the vessel and survey them into the local coordinate reference system. If there is no system onboard AnkoBluepix will establish a new system. Static calibration is preformed at quay side with simultaneously logging of AnkoBluepix and vessel systems. From these loggings a C-O will be calculated. A verification is performed after the values has be put into the vessel system, to verify that everything has been done correctly. AnkoBluepix also offers Dynamic calibration. This is a calibration preformed at open sea. If the client has a tight time schedule we can perform the calibration while in transit.

- **ROV**
  When a new sensor is installed on the ROV the sensor is surveyed to get the position and the installations angles. To verify the function of the sensor a navigation system control should be performed. The most preferred procedure is to set the ROV on land, let the sensors stabilize and start simultaneously logging of AnkoBluepix and ROV systems. C-O can be calculated and entered into the software.

- **Subsea Structure**
  When a Subsea structure is installed subsea, there are often sensors mounted on the structure itself to control the operation. Checking the sensors before load out will document that everything is in order before the operation starts.

Subsea Structures

The main reason for survey of subsea structures prior to load out is to get a complete documentation of the overall construction and items on the structure

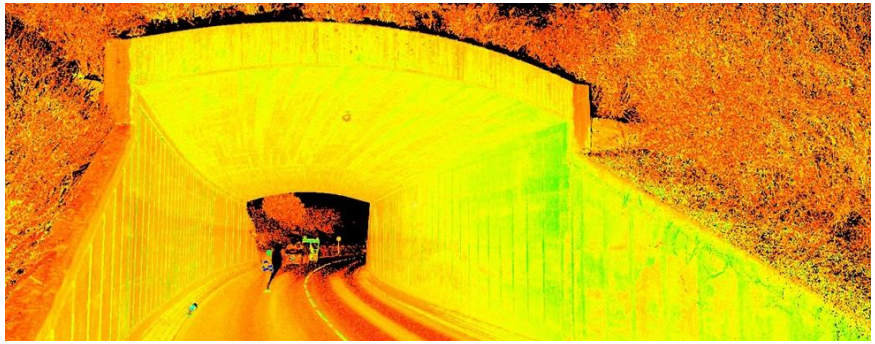
Important tasks that AnkoBluepix can assist with:

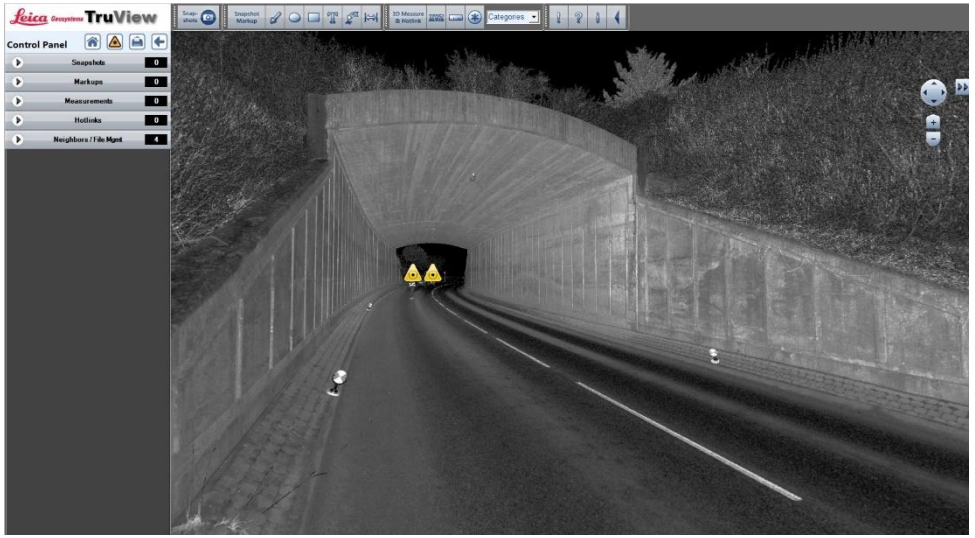
- A third party control on as-built
- Connect every sensor and installation piece into one common coordinate reference system
- Install and survey Photogrammetry markers , so the structure is ready to be surveyed subsea
- Document that vital installation pieces such as Guide pins, Guide Funnels and Landing Pads are correctly mounted
- Measure Installation angles on each sensor so they all refer to the same centerline and reference plane (common coordinate reference system)
- Perform a navigation system control on the sensors installed on the structure to document that the sensors are suitable for the installation work.

3D Scanning

The main reason with 3D Laser scanning is to collect as many points as possible and construct a point cloud / 3D model for use and documentation

- Perfect tool to collect point clouds
- Scanner can collect as many as 975 000 points pr second
- More efficient on large areas than a Totalstation
- From the point cloud, information can be taken out when the user needs it
- A method that gives the client good documentation
- Results nicely presented in Truview
- User can sit in office, log on Trueview and «move around» in scanned area on the computer



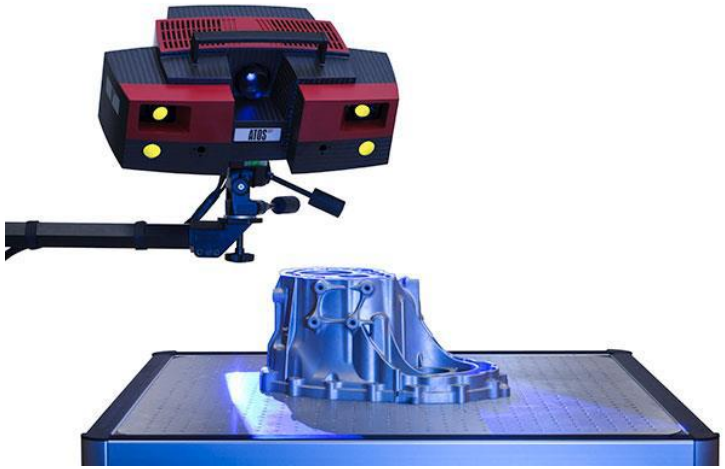


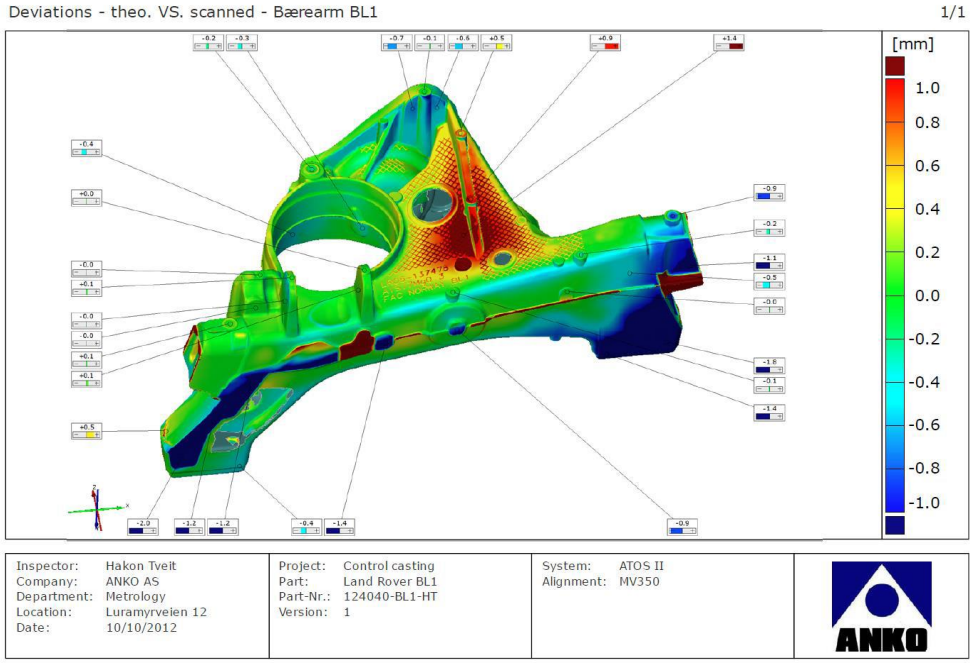

bluepix


TruView
Control Panel
Snapshots
Markups
Measurements
Hotlinks
Neighbors / File Mgmt

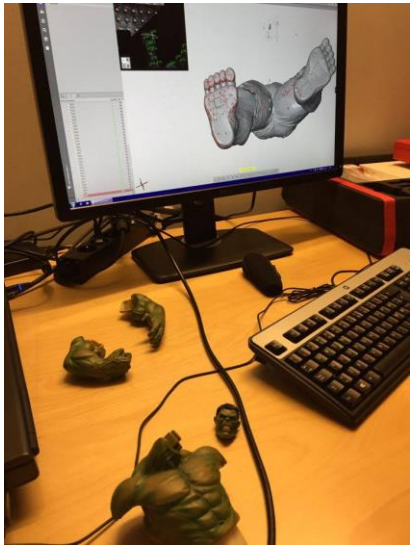
ATOS Scanner

- Our most accurate survey scanner for industry purposes.
- Accuracy within +/- 0.01mm
- When scanning, the ATOS take photogrammetric images that are stored as 3D pixles (pointcloud)
- No Noise in pointcloud





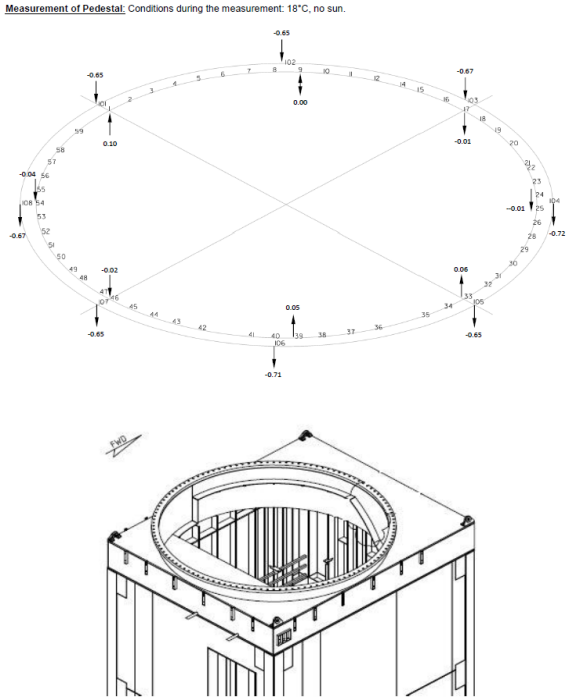
The Hulk



The ATOS scanner was used to scan an action figure. From this scan our client was able to 3D print the action figure in large scale, keeping all the details from the original figure.

Leica Laser Tracker

- Our most accurate instrument
- Used for projects that demands extremly high accuracy
- As flexible as an Totalstation
- Accuracy +/- 0.004mm
- Perfect tool to control machined surfaces



Measured elevation - Z				Measured elevation - Z			
Point no.	X	Y	Z	Point no.	X	Y	Z
1	0.00	2597.76	0.10	101	-12.03	2739.89	0.65
2	269.31	2585.81	-0.01	102	1939.06	1941.30	0.65
3	545.46	2544.94	-0.04	103	2745.01	78.38	0.67
4	813.03	2471.90	-0.06	104	1955.68	-1915.21	0.72
5	1066.78	2372.92	-0.03	105	11.59	-2743.63	0.65
6	1300.95	2252.76	-0.03	106	-2018.83	-1861.02	0.71
7	1534.85	2100.44	0.00	107	-2744.04	7.32	0.65
8	1743.30	1931.15	-0.01	108	-1944.57	1926.62	0.67
9	1930.46	1744.54	0.00				
10	2099.29	1537.85	-0.02				
11	2248.02	1311.20	-0.03				
12	2372.62	1067.66	-0.02				
14	2478.00	793.93	0.01				
15	2533.80	590.52	-0.03				
16	2585.95	270.97	-0.03				
17	2598.85	-15.13	-0.01				
18	2584.05	-289.02	-0.01				
19	2541.05	-535.69	0.00				
20	2462.60	-821.62	0.14				
21	2300.01	-1202.73	0.10				
22	2254.18	-1285.61	-0.02				
23	2102.99	-1520.57	-0.02				
24	1939.73	-1725.79	0.01				
25	1751.23	-1914.78	-0.01				
26	1535.78	-2090.91	-0.11				
28	1317.25	-2235.88	-0.02				
29	1079.81	-2360.45	-0.02				
30	799.56	-2470.05	0.01				
31	528.18	-2542.67	0.02				
32	329.37	-2576.42	0.03				
33	16.47	-2598.26	0.06				
34	-265.71	-2585.83	0.06				
35	-553.48	-2539.66	0.04				
36	-1068.50	-2371.94	0.05				
37	-1334.93	-2235.02	0.05				
38	-1587.51	-2065.69	0.04				
39	-1774.60	-1908.62	0.05				
40	-1944.61	-1735.32	0.06				
41	-2093.81	-1550.85	0.05				
42	-2365.85	-1083.45	0.06				
43	-2472.94	-808.40	0.03				
44	-2542.27	-547.49	0.01				
45	-2583.40	-285.31	-0.01				
46	-2597.86	-25.09	-0.02				
47	-2593.63	138.29	-0.05				
48	-2551.78	480.22	-0.07				
49	-2507.09	674.20	-0.05				
50	-2419.82	939.19	-0.06				
51	-2320.94	1161.69	-0.05				
52	-2187.68	1395.52	-0.04				
53	-2020.13	1628.03	-0.01				
54	-1844.54	1825.98	-0.04				
55	-1648.48	2004.93	-0.04				
56	-1428.16	2167.33	-0.04				
57	-1184.79	2308.70	-0.04				
58	-957.57	2411.48	-0.07				
59	-563.25	2533.16	0.16				

Bluewind - Offshore Windmills

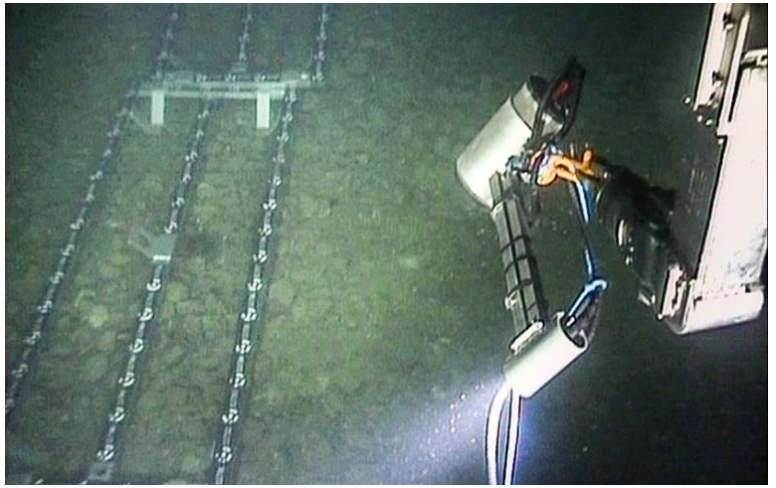
- Our own developed software – **Bluewind**
- **Monopile installation** Monopile position accuracy better than +/- 0.2m and continuous monitoring of verticality during hammering with elevation accuracy +/- 0.1m. As-built documentation delivered shortly after hammering is completed.
- **Transition piece installation** Quick, safe and reliable installation of equipment on TP top prior to lifting. Gyro and/or GPS is used for heading and motion monitoring during lifting and jacking. All with redundancy on heading and motion. Also flatness survey of TP flange can be performed. Finally, As-built documentation will be provided.
- **Dimensional Control** As-built report

Underwater Photogrammetry

- Subsea metrology using Close Range Photogrammetry, a well-proven method. Procedures and equipment have been designed uniquely to ensure easy subsea handling and reduce vessel time to a minimum, without compromising safety and accuracy. The method can be used at any depth. We have called our system BlueEye.
- Point measurements can be performed with an accuracy of 1 to 10000 or better over lengths of more than 100 meters.

BlueEye can be applied for any structure where you want survey results, for instance:

- Spool Metrology
- Dimensions of small and large structures
- Geometry of Jackets including nodes and legs
- Pile survey
- Guides and mini-posts
- Dents and damages
- Straightness, flatness and alignment surveys



Underwater Photogrammetry

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Drone Survey

- Efficient method to survey large areas in short time. As the survey is done from the air, the work can continue as normal. It has a high survey accuracy.

Falcon – 8

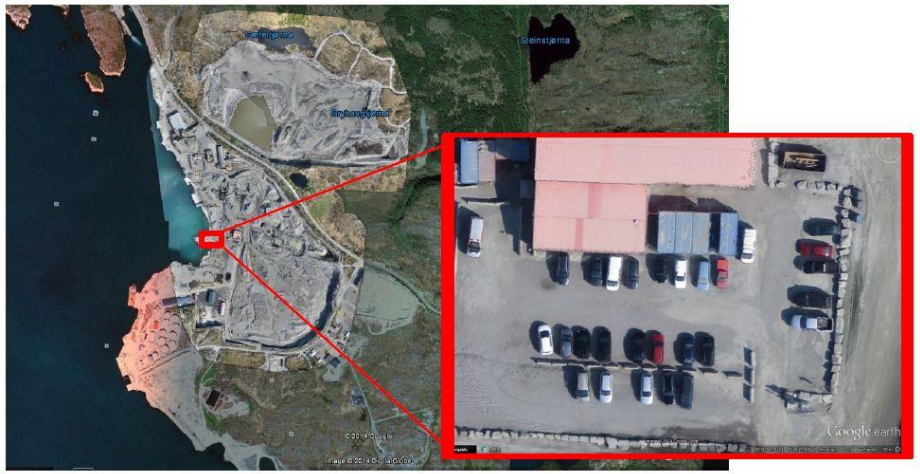
- Terrain Profiles
- Mass Calculation
- Detailed surface model of terrain
- 3D model with opportunities for visualization
- Contour mapping
- Mapping of vertical surfaces such. mountainsides

Google Earth

- Google tiles, chart plotter that can be imported to locations in Google Earth that has poor resolution.

Original photo Google Earth

Pictures taken with the drone placed in Google Earth



Contact

Please get in touch for any survey tasks where we can be of assistance

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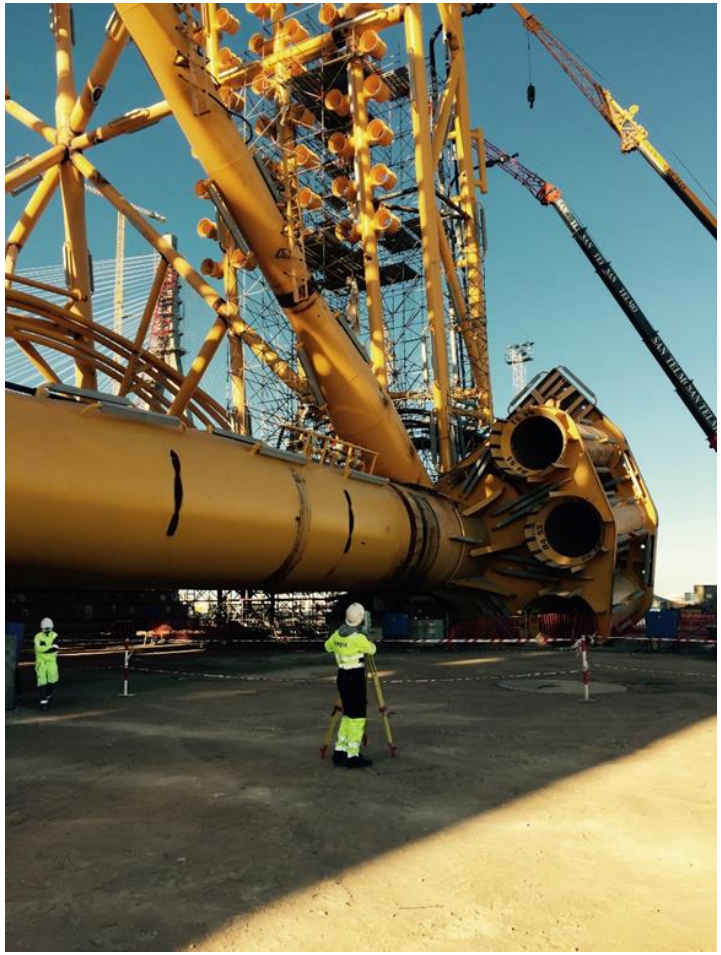

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