'Alexandros Karditsas & partners
Surveying Consulting Services' |AKSM|
392 Mesogeion Avenue| 15341 Agia Paraskevi, Athens | GREECE
T: +30 210 9702510 | F: +30 213 0285617 | M: +30 694 4774491
info@aksm.gr

www.aksm.gr

Shipping Industry

SURVEYING PRECISION

aksm
land-building-industrial
SURVEYING & MAPPING

The COMPANY

AKSM is a growing firm with 48 employees involved on industrial and dimensional control surveying projects all over the world.

Our employees are surveyor engineers with great experience in such projects and trained to the latest surveying methodologies and instruments.

Having so far completed more than 800 dimensional control applications, we are in position to meet the projects needs and our client's expectations.

SHIPPING INDUSTRY

We provide the manpower, the equipment and the precision to complete your project on time.
We apply the latest laser scanning & conventional surveying technics in order to ensure that the construction is in accordance to the specs.

3D Laser Scanning

We capture 3D measurements to model the environment, through data at a point in time which can be modelled, queried or archived.

Hull Scan

- Ship hull shape, dimensional analysis, control and verification.
- Weld distortion, geometry inspection
- Internal & Interior modification
- Hull as build for insurance inspection and damage analysis.
- Model creation for parts installation and assembly
- Deformation analysis and report creation on tanks
- Deformation analysis (Sagging - Hogging – Twist)

Shaft Prealignment - Alignment

- 3D Stern Tube Casting verification in Hull Cartesian Coordinate System.
- 3D Stern Tube Bearing verification in Hull Cartesian Coordinate System.
- Clearance Verification between Stern Tube Casting and Stern Tube for Epocast 36.
- Rudder Stock axial line determination.
- M/E Foundation Verification in Hull Cartesion Coordinate system.

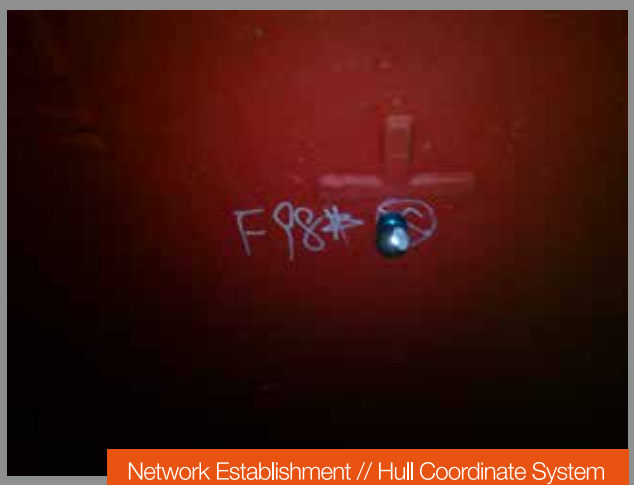
General Setting Out Activities

- Support of ship docking
- Marking on ship

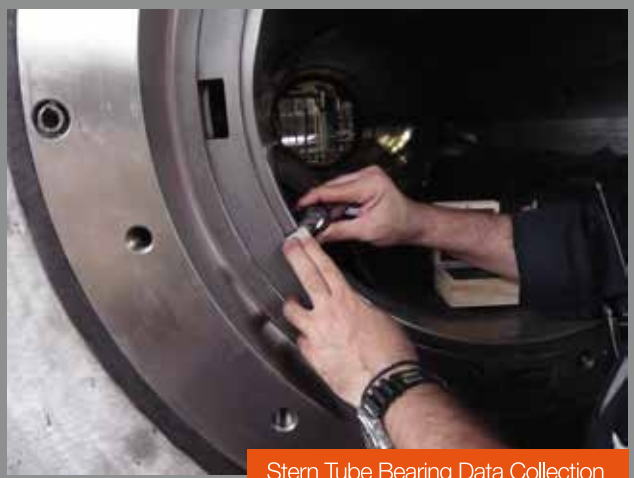
BENEFITS

- Having accurate 3D documentation of commercial ship can save time and money (disaster recovery, retrofitting design)
- It is contactless. Scanning is remote, reflector less measurements and this is safe and in dangerous environments.

CL Determination//Hull Coordinate System



Network Establishment // Hull Coordinate System



Stern Tube Bearing Data Collection

LASER SCANNING

Laser Scanners capture the entire part geometry for inspection or dimensional analysis & verification, covering both freeform surface and geometric features.

WORKFLOW

A> High Accuracy Total Station

Leica TS-30
Sokkia NET-1
Leica MS50

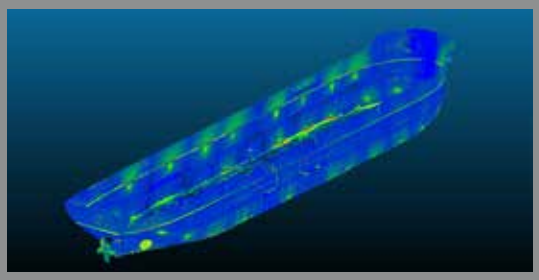
→ **3dim Observer** → **GLM** → Reference System → **Hull Coordinate System**

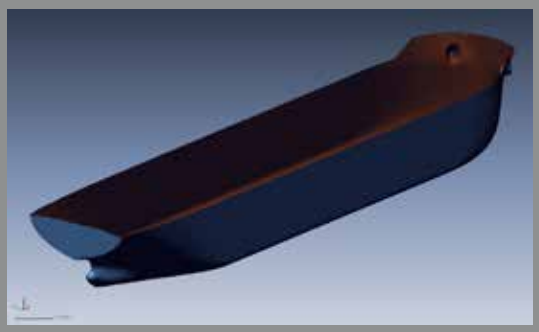
B> Laser Scanner

Raw data collection (Topcon GLS-2000 Leica MS50)

Raw data processor → **Leica Infinity**
Point cloud registration → **TopCon ScanMaster**

Post processing (Geomagic X, AutoCAD, Kubit)
Primitive fitting through model creation
Inspections & dimension analysis



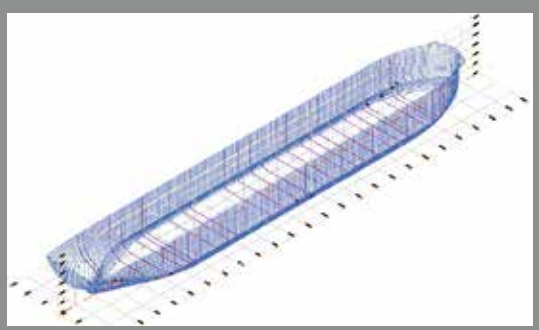


APPLICATIONS

Deformation Analysis
Deck Plate Weld Distortion Flatness Checks
Hogging / Sagging / Twist / Straightness

Hull As-Built for
Technical Failure Analysis
Modeling
Hull Plate Forming Inspection
Ship Hull Shape – Damage Inspection
General In-Process Subassembly Inspection

Internal As-Built for
Loading & Deformation Analysis (Tanks)
Ship Pump Rooms - BWTS Installation
Interior refurbishment & modifications



BENEFITS

Accurate
High density on measurements
2 mm point accuracy collection
Fast
Up to 1000000 points / sec collection
Safe
Minimizes the time personnel have to spend in high risk areas.

M/E ROOM 3DLS

Through 3D Laser Scanning technics we produce the accurate and efficient layout to be used for:

- Retrofitting & Ballast Water Treatment Installation.
- Equipment installation & modification.

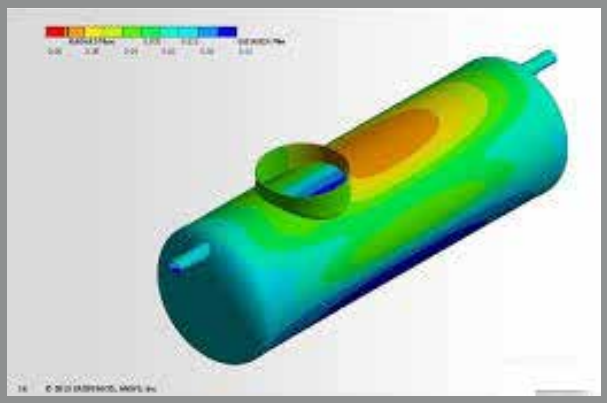
The M/E equipment arrangement is represented on 3D model so that:

- To develop and customize the equipment needed without further delays.
- Compare and cost control different approaches and options.

DEFORMATION ANALYSIS

Based on the results, terrestrial laser scanning can demonstrate its potential in deformation and load test measurements.

- The laser-scanned point cloud holds information about the whole visible part of the structure.



- It enables the displacement and deformations to be measured during the post-processing, without the use of previously highlighted control points.

- Analyzing the structure's displacements and distortions in 3D provides reasonable information for engineers in the investigation of structural behavior.

- Laser scanning can allow measurements not possible by traditional methods.

SHAFT PREALIGNMENT & ALIGNMENT

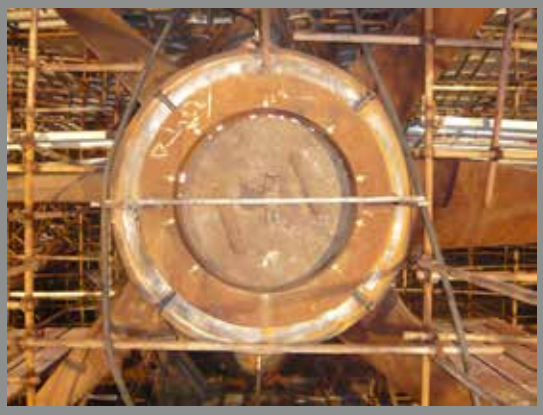
High accuracy Robotic Total Stations and special accessories are used, to examine and verify the constructed stern tube CL on Hull Coordinate System.

WORKFLOW

A. Hull CL Determination

- Leica TS-30
- Sokkia NET-1
- Leica MS50

3dim Observer → **GLM** → **Reference System** / **Hull Coordinate System**



B. Stern Tube CL Determination

- Leica TS-30
- Sokkia NET
- Leica MS50

3dim Observer → **GLM** → **Casting / Bearing / ME** // **Hull Coordinate System**

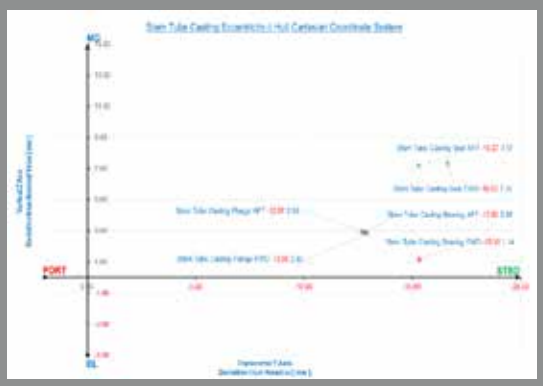
- 3D Stern Tube Casting verification
- 3D Stern Tube Bearing verification
- Clearance Verification between Stern Tube Casting and Stern Tube for Epocast 36
- M/E Foundation
- Intermediate bearing verification

C. Rudder Stock CL Determination

- Leica TS-30
- Sokkia NET
- Leica MS50

3dim Observer → **GLM** → **Axial Line Determination** // **Hull Coordinate System**

- Steering gear foundation determination
- Stuffing Box determination
- Upper Casting Bush / Lower Casting Bush determination



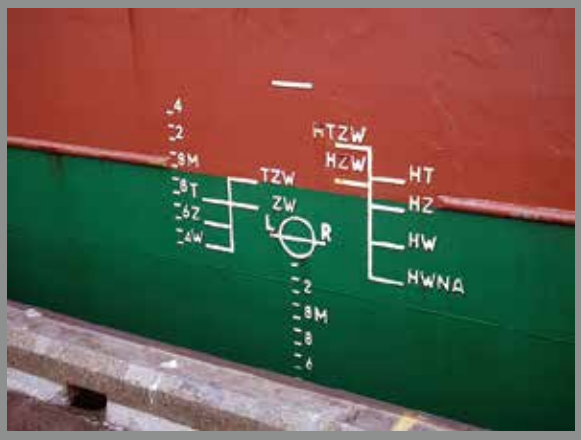
BENEFITS

- Fast / Less than 2 hours for deviation calculation
- Accurate / Definition of misalignment < 0.9 mm
- Real time calculations on site
- Comparison with design plans
- Applicable on the construction dock, day and night without delays

SHIP DOCKING

We prepare the dry dock. Keel blocks are set into position, in accordance to the docking plan, to support the keel of the ship.

Horizontal and elevation determination is made, so to minimize the stress on the hull and avoid blocking sea openings and bottom plugs.



SHIP MARKING

Based on the measurements performed on the keel and on the hull we determine and we set out either we verify:

- The line, where the hull of the ship meets the surface of the water - **Waterline**.

- The level at which ship floats on the water at different locations - **"Plimsoll Line".**

PROPELLER INSPECTION

With reference to the measurements and by using 3D laser scanning equipment:

- We calculate the symmetry in accordance to the axis alignment.
- We create 3D model for inspection.

MAJOR MODIFICATIONS

Based on the as built surveys in relation to the modification plans:

- We accurately set out for major modifications (fins, doors etc).

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