‘Alexandros Karditsas & partners
Surveying Consulting Servises’ | 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

Industrial Surveying

SURVEYING PRECISION

aksm
land·building·industrial
SURVEYING & MAPPING

THE COMPANY

In today's complex construction environment our innovative expertise, analysis and carefully crafted approach can help bring security to construction process. AKSM implements high accuracy applications which allow us to survey with pinpoint accuracy for industrial projects.
Our experienced staff at AKSM supports manufacturers in a wide range of construction process in order to meet specifications in terms of precision. We provide measurement data with high precision for accurate information on the size, shape and position of objects. We can carry out spot on measurement on site with the advantage of the latest technology.

INDUSTRIAL SURVEYING

We offer a wide range of industrial surveying services from offshore surveying of industrial facilities and equipment to offshore surveying in demanding environments. Measuring with accuracy in harsh environments is a challenging issue to solve, that requires the use of the most advanced techniques and qualified personnel.
Recent advancements in High Definition Laser Scanning and 3D Modeling technology has a significant and beneficial impact on our ability to support industrial surveying application.

High Pressure Natural Gas and Regulating Station, Tema, Ghana

SERVICES

- Personnel & equipment provision
- Method statement provision
- High accuracy Network installation & maintenance
- Determination and control on building's elements
- Geometry verification and As Built Surveys.
- ISO standards incorporation – quality control records creation
- High accuracy applications in corporation
- Control of axes : alignment, parallelism, verticality, flatness control
- Position alignment on large engines or assembly of different parts (flanges, anchors, e.t.c.)dimension control
- Geometry control and verification on prefabricated parts of large constructions in projects like bridges, pipes, wind power generators
- Deformation analysis & control
- Survey & geometry determination through point cloud collection
- 3D Scan Service
  - 3D digitalization of components
  - 3D inspection with CAD models
- 3D Total Station Services.
  - Dimensional analysis - Position alignment
  - Setting out

High Pressure Natural Gas and Regulating Station for the Feeding of V.R.A. at Takoradi.

Tsakona Bridge, Kalamata

APPLICATIONS

- Shipbuilding
- Rail Vehicles
- Pipes & Flanges
- Plant construction
- Steel construction
- Machine Assembly
- Aircraft Construction
- Monitoring
- Tunneling & Mining
- Wind Energy Industry
- Paper Industry
- Scanning & Tracking

Natural Gas Unit ,Nea Mesimvria Thessaloniki.

COMPANY' S PROJECTS

Terna S.A. – Unit V, P.P.C. S.A.
Construction of new natural gas unit at Unit V of P.P.C. S.A., Megalopolis, Arkadia

Emek S.A. – Wind Turbine Towers
Dimensional analysis verification survey on constructed geometry, Aspropyrgos, Attica

Power Alstom Italia S.p.A . Unit III, P.P.C. S.A.
Construction of new Wet Flue – Gas Desulphurization (WFGD) Unit at Unit III of P.P.C. S.A., Megalopolis, Arkadia.

Emek S.A. – Rio – Antirio Bridge
Replacement of Rio – Antirio Bridge's special parts, Corinthian Gulf

Metka S.A. – Unit V, P.P.C. S.A
Construction of Unit V of P.P.C. S.A., Aliveri, Evoia

Emek S.A. – Tsakona Bridge
Construction of Tsakona Bridge, Arkadia

Intrakat S.A. – 5 New Silos at Halyps Cement Industry
Construction of 5 new silos in the area of Halyps Cement Industry, Aspropyrgos, Attica

Emek S.A. – Gas Compression Station
Erection of gas compression station, New Messimvria, Thessaloniki

Emek S.A. – Tanks and Silos
Construction of new industrial buildings, tanks and silos, Varitimi, Milos Island

Metro S.A. – Trafigura - Tank Farm
Erection of Trafigura Tank Farm. Procurement and installation of 18'' pipeline Thema, Ghana.

Emek S.A. – Halivourgiki S.A. facilities
Construction and extension of RM2 Unit and Spooler Unit at Halivourgiki S.A. facilities, Elefsina, Attica

Metro S.A., West Africa Gas Pipeline Company –Natural Gas Station
Erection of high pressure natural gas metering and regulating station.

Fulgor S.A. – New Production Cable Line

Construction of facilities and new buildings for the creation of new production cable line, Korinthos

Sidma S.A. – New Factory, Inofyta

Construction of Sidma S.A. new factory production line. Inofyta, Viotia

Emek S.A. – Mine Tunnels

Mine tunnels survey through point to cloud collection and verification surveys on existing equipment.
Olympiada, Chalkidiki

Sidma S – New Factory, Aspropyrgos

Construction of SidmaA. new factory at Aspropyrgos, Attica

Emek S.A. – Elefsina Shipyards

Topographic support for reconstruction of bridge crane at shipyards, Elefsina, Attica

Emek S. Metal Construction

Topographic support of metal construction at cement Industry of Titan S. A., Kamari, Viotia

Metron S.A. – Elefsina Refinery

Flare at Elefsina Refinery of Hellenig Petroleum, Attica

Emek S.A – Bridge Crane

Alignment control of bridge crane rails at Corinth Pipeworks S. A. , Thisvi, Viotia

Emek S.A. – Skaramagas Shipyards

Construction and extension of industrial buildings. Topographic support for construction of new bridge crane rails, Skaramagas, Attica

J/V Terna S.A. , Salini Impregilo S.p.A – SNFCC

Preconstruction and erection of canopy through laser scanning technique, Kallithea, Attica.

Emek S.A. – Factory Area

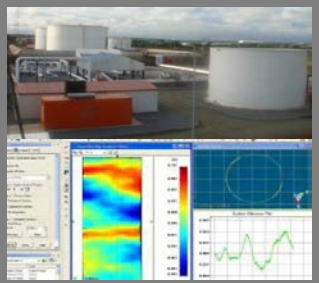
Extension of facilities and new buildings of Emek S.A. factory, Aspropyrgos, Attica

DS Steel S.A – Steel Work

Eastern structural steel work for the Doha 2006 Asian Games Ceremonies, Doha, Qatar.

Lubricants Cyclon S.A. – Factory Area

Topographic survey through point cloud collection Aspropyrgos, Attica



Metro S.A., West Africa Gas Pipeline Company – Natural Gas Station

Erection of high pressure natural gas metering and regulating station for the feeding of V.R.A at Takoradi, Ghana.

CASE STYDY
The SNFCC ferrocement Canopy construction & erection

The ferrocement canopy of the opera building is made out of two ferrocement skins: the superior one (top skin) and the interior one (bottom skin). They are connected together by ferrocement diaphragms and steel diagonal circular hollow tube sections. Each skin consists of different ferrocement panels casted into steel formworks during the canopy preconstruction phase. The general methodology, for the canopy, envisaged foresees the preconstruction on the ground of 6875x3173mm (typical prefabricated panel dimension) precast elements corresponding to parts of the bottom and top skin of the canopy that will be connected with splice zones at the final canopy position which have equal dimensions of 577mm between the ribs.

- PRECONSTRUCTION

Each ferrocement panel is casted on metal formwork (4000x800) installed on metal benches. It consists of a thick steel plate (t=10mm), that is made rigid with upn sections, is leveled and is connected via stiffeners to turnbuckles which allow the creation of the exact curvature for each panel. The steel plate is controlled by 64 points that correspond to the panels geometry. Deformations and deflection on the surface at the plate were adjusted accuracy leveler and invar rod.

Subsequent to the surface adjustment, the panel's reinforcement was placed on the casting mould. The reinforcement was placed on the mould in a way that is constructed ribs and beams axes to perfectly match the theoretical axes that had been set out to the casting table. Correction movements were performed in order to eliminate deviations, by investigating the position of the implemented to the reinforced couplers. First the 28 mm skin was casted. Then by screw adjusted side would were used in order to cast the ribs, the beams and thickenings.

Reflective targets mounted on steel plates, placed on side would were used in order to verify the alignment on ribs and beams.

Finally control points were installed on the inner side of the panel and on the external visible side to be used during the erection sequence via the transformation from Local (preconstruction) to Global (erection) reference system.

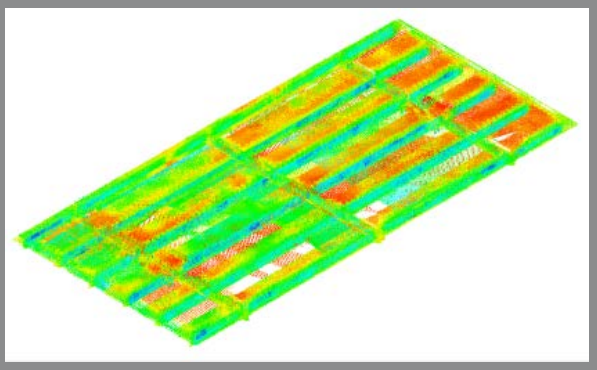
• GEOMETRY VERIFICATION PRIOR TO ERECTION

For each unit a fully referenced registry report was created by using 3D Laser Scanning Techniques. Each panel was evaluated on its constructed geometry:

- Curvature of the casted slab
- Slab thickness
- ER points coordinates deviation in relation to As-Built values
- Ribs, Beams width and CL

• CANOPY ERECTION

i. Network Establishment
A high accuracy network (sd <1 mm), was established on the Roof of the Opera Building consisting adequate in number and distribution on the area of interest and finally determined in geometry and position in relation to the density of the scaffoldings. In total 90 benchmarks for CCR prisms were established and incorporated to the main network.



ii. Panels erection
Preliminary installation took place with measurements performed on the other side of the panel. Then each panel was adjusted on its final position by measurements performed on the inner side (installation of control points). Finally each panel was examined for its final position in relation to the adjadcent, in order to fulfill the erection criteria.

iii. Bracings (metal structure) installation.
Each part of the internal steel structure mas modified according to the as- built model provided to the designer. Final adjustments were performed by measurements.

iv. Upper skin installation
Each top skin panel was preliminary positioned by the use of the bracings calibrated.
Then the final adjustment took place by using the control points established during preconstruction.

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