





**YOURSILO
ENGINEER**





**Specialists in
grain storage silos for 25 years**


Introduction

 is an expert team in grain silo storage and processing.

 is manufacturer and supplier neutral.

 has practical experience across sectors and geographies.

 tackles practical, technical, commercial, and R&D requests.


 provides technical solutions, improves grain management, and reduces cereal losses.


YourSiloEngineer



Grain Silos Market


Market Outlook

 **Growth Drivers:** Increasing global population demands improved storage and processing infrastructures.

 **Preference for Steel Silos:** Lower cost, rapid deployment, and minimal maintenance drive adoption

Product Perception

 **Commoditized Nature:** Silos are seen as straightforward storage solutions, not complex technical assets.

 **Opportunity for Innovation:** Limited evolution among current manufacturers opens doors for innovative newcomers.



Grain Silos Market

Industry Challenges



Product Centric Focus: Manufacturers often neglect application knowledge and plant management, impacting profitability.



Lack of Support: Inadequate aftersales service and project evaluation capabilities hinder operational efficiency.

Norms and Standards




Regulatory Knowledge Gap: Industry lacks comprehensive understanding and application of norms in silo and grain storage practices.





Consultation Trends

Current Trends


 Increasing demand for professional advice and services across industries.

Services Offered


 Silo plant design, implementation, operations, and process improvements.


 Design norms, standards, and their applications.

 Maintenance practices, including silo cleaning.


 Training for plant staff.

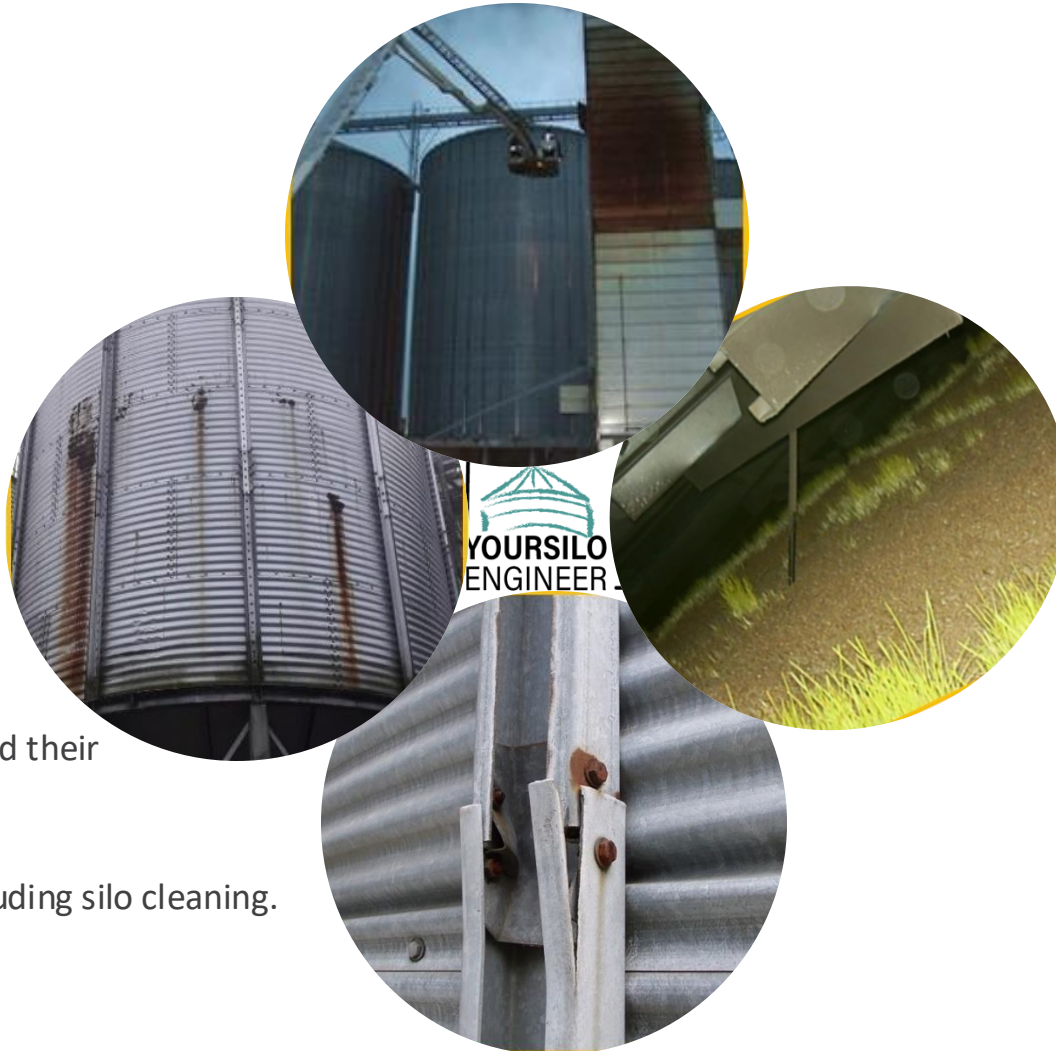
 Grain storage practices enhancement.

 Technical evaluation of silos and silo plants (aerial, internal, and external).



















 Turnkey erection and project management.

Diverse Clientele











 Consultations sought by silo and grain handling manufacturers, turnkey suppliers, investors, operators, governments, and insurers.













Services can be Offered to Different Sectors

Service Category	Details
Producers of Silos and Related Equipment	<ul style="list-style-type: none">  Manufacturers of silos  Manufacturers of dryers and handling equipment  Machinery and seed selection  Machinery for feed mills and biomass  Equipment for agro-industrial plants
Engineering Companies Offering/Requiring Grain Storage Solutions	<ul style="list-style-type: none">  Engineering and industrial consultancies  Dealers of agricultural equipment  Integrators  Agricultural consultants
End Users, Investors, and Traders in Grain Storage Equipment	<ul style="list-style-type: none">  Farmers, cooperatives, and agro-holdings  Traders and port authorities  Breweries and malting plants  Feed and flour plants  Processors  Biomass operations  State agencies or government entities  Insurance companies  Investment funds














Services can be Offered to Different Sectors

Service Category	Details
Development of specific IT tools	 Silo calculation tools, according to different norms  Calculation tools for steel structures  Aeration simulations tools
Full product development	 Project management: project planning, 3rd party integration  Onsite supervision of the installation with own staff and/or certified subcontractors
Supplier evaluation	
Marketing and sales assistance	
Review of design norms	 Applicable design norms for silos, machines, and electrical equipment
Staff training	 Training in silo plant operations and grain management
Support on R&D projects	 R&D projects for handling equipment and silos
Silo design improvement	
Structural design	 Catwalks, towers, buildings
Certification processes	 Local certifications
Manufacturing plants	



Services can be Offered to Different Sectors

Service Category	Details
Project Management	 Project planning, 3rd party integration, onsite supervision with staff or certified subcontractors
Pre-contract Work and Planning	 Preliminary planning, flow chart definitions, layouts for silo plants and processing industries
Budgeting and Financial Evaluation	 Preliminary, manufacturer-independent budgeting
Technical Tender Evaluation	 Technical tender or RFQ documentation evaluation
Machinery Purchase Advice	 Professional advice for machinery purchase through technical analysis and evaluation
Technical and Economic Analysis	 Analysis and evaluation of project offers, investor assessment, technical specification explanation
Consulting in Quality Control	 Consulting services in quality control and machinery assembly
Quality Control Services	 Material acceptance and inspection at supplier warehouses, on-site reception
Review of Design Norms	 Review of design norms for silos, machines, and electrical equipment
Staff Training	 Training in silo plant operations and grain management

Services can be Offered to Different Sectors

Service Category	Details
Pre-contract Work and Planning	 Preliminary planning, flow chart definitions, layouts for silo plants and processing industries
Budgeting and Financial Evaluation	 Preliminary, manufacturer-independent budgeting
Technical Tender Definition	 Technical tender or RFQ documentation definition
Soil Analysis	 Soil analysis
Machinery Purchase Advice	 Professional advice for machinery purchase through analysis and technical evaluation
Technical and Economic Analysis	 Analysis and evaluation of project offers, investor assessment, technical specification explanation
Project Planning and Management	 Project planning and management for investors, from contract to installation sign-off
Consulting in Quality Control	 Consulting services in quality control and machinery assembly
Site Inspections and Evaluations	 Existing site inspections and evaluations
Quality Control Services	 Material acceptance and inspection at supplier warehouses, on-site reception
Review of Design Norms	 Review of design norms for silos, machines, and electrical equipment
Staff Training	 Training in silo plant operations and grain management
3D Implementation Drawings and Animations	 3D implementation drawings and animations

Services can be Offered to Different Sectors

Service Category	Details
Economic and Financial Analysis	 Economic and financial analysis of investment, documentation for loan applications
Documentation Management for Grants	 Documentation management for state grants when applicable
Certification Processes	 Certification processes to receive required local certifications
Business Plan Evaluation	 Business plan evaluation
Insurance Advice for Disasters	 Professional advice to insurers for decision-making in case of disaster
Silo and Equipment Inspection	 Silo and handling equipment inspection and refurbishment
Project Financing	 Project financing
Silo Cleaning	 Silo cleaning
MRO Planning	 MRO (Maintenance, Repair, and Operations) planning

Optimized Performance, Maintenance, and Inspection Services

Comprehensive Silo and Equipment Management Solutions

- Review and analysis of statical reports of silos and steel structures
- Handling equipment performance calculations and improvements
- Advice on aeration & chilling performances
- Improved temperature, humidity and CO2 detections
- Inventory management systems
- Summarizing and development of operation and (preventive) maintenance procedures and simplified documentation, based on supplier specifications & previous experiences, as well as ad hoc machinery; intelligent MRO Software
- Silo cleaning
- Silo collapse inspection and analysis
- Silo site inspection and evaluations



End user, investors or traders, operating or investing grain storage equipment



Engineering companies offering / requiring grain storage solutions into /from the market



Producers of silos, handling equipment and other related agricultural equipment



Silos Grain Dryers

Handling Know - How

Transfer or Sell

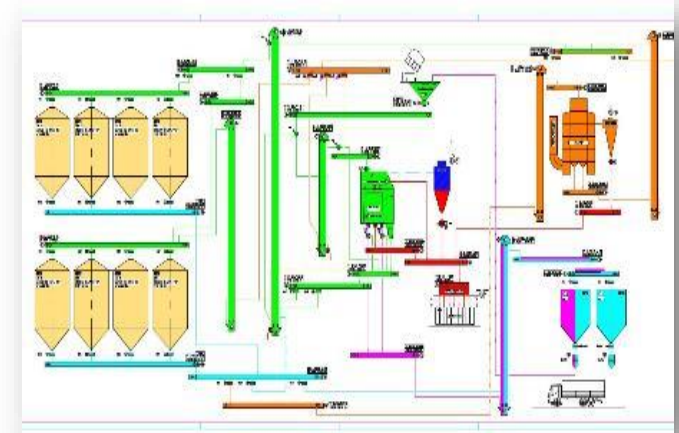
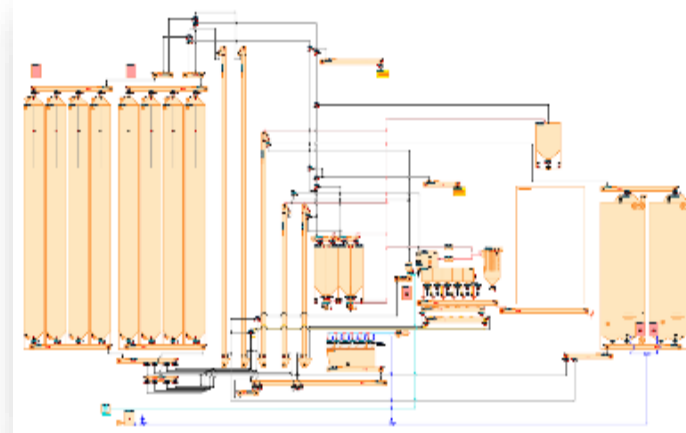
- We provide you with all our Knowhow and information on our grain dryers so that you can manufacture in your country.
- Remote technical assistance both commercial and technical. Renewable annually.
- Onsite assistance for commissioning and assembly.

Benefits

- You will increase your customer portfolio.
- Your brand will gain value.
- You will be positioned in the market with a more attractive and complete offer.
- Your company's goodwill will increase.



Smart Connection Process Engineering Software



Technology:	SmartwiringSoftware	Traditional flowchart
Number of elevators:	5 Elevators	6 Elevators
Design of conveyors	short distances	long distances
Flexibility	parallel processes	less parallel processes
Review of flowchart and concept	Easy	x (hardly possible)
Miscellaneous	maintenanceoptimize d component allocation	Not considered

Material Properties Identification

- e.g. Rape or soja seed meal, other non free flowing prducts
- Pellet and non pelletized materials
- Following Eurocode procedures
- Research for adecuate unloading systems and / or grain load assessments in silos and hoppers

5 Results

5.1 Bulk density ρ_b and bulk unit weight γ

The bulk density ρ_b and the bulk unit weight γ depend on the stress which has an effect on ρ_b with material, i.e. they generally increase when consolidation stress increases.

Table 1, Figure 1, and Figure 2 show the results of the measurements made. Table 1 shows the conversion according to BS EN 1991-4.

Consolidation stress (kPa)	Bulk density (kg/m³)	
	Experimental value	Technical value
0	118	118
1	118	118
5	118	118
10	118	118
20	118	118
30	118	118

Fig. 1: Bulk density for new material.

	Experimental value	Technical value
Bulk unit weight γ (kN/m³)	11.6	11.6
Conversion factor γ_{10}	1.0	1.0
Design value γ_d (kN/m³)	11.6	11.6
Design value $\gamma_{d,10}$ (kN/m³)	11.6	11.6

Fig. 2: Bulk unit weight for new material according to BS EN 1991-4.



Project Management

- 2 off 60 000 tons wheat storage plant
- @ 200 tons/hour handling
- Complete Project Management, EPCM Type, Civil design management, process design management, construction & contract management, procurement, erection supervision, dry testing and commissioning...
- Location: Egypt

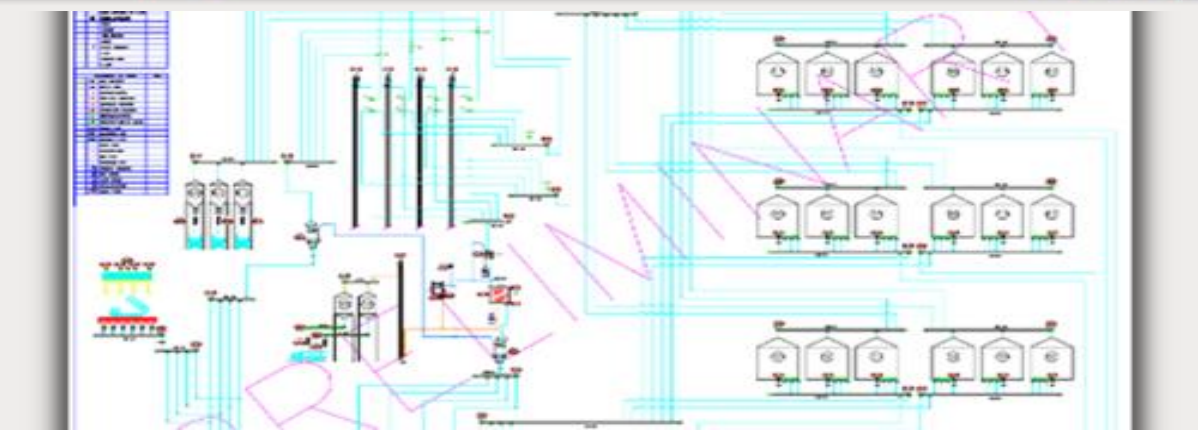
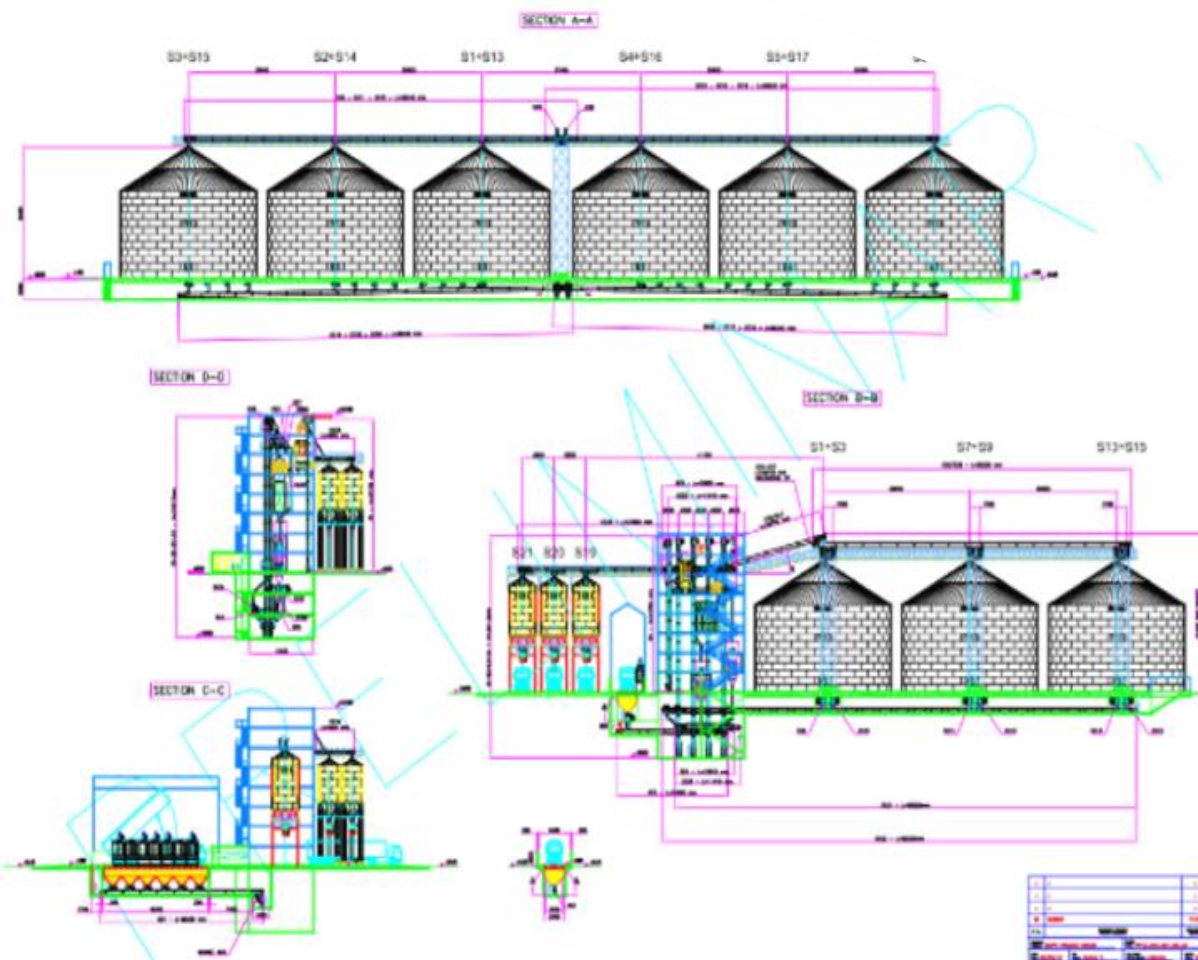


60 000 MT



Project Definition

- Public Tender
- 90 000 ton grain silo plant:
- Full process definition, equipment and performance specification, layout and flow chart
- Elaboration technical specification documentation, supplier requisition sheet
- Tendering and procurement advice
- Location: Egypt



References and Examples

Silo Collapse

- Silo plant with 5000 ton silos
- Assistance after silo collapse
- Accident analysis and report
- Security and safety measures
- Dismantling process advice
- Location: Ukraine



Project Management

- Port Project
- 240 000 tons storage
- Project management including erection supervision.
- Silos, steel structures, grain cleaning, ship unloading and handling equipment
- Statical calculation report for local authorities as per Eurocodes and specific country annex.
- Supplier audits (in factory)
- Setup of project specification for silos and handling equipment
- Location UK



240 000 MT





Structural Design

- Statical calculation, design and manufacturing for a wide span catwalk suitable for a 1000 tons/hour conveyor of a renowned handling equipment manufacturer
- Project management including installation and equipment start up.
- Statically calculation report for local authorities as per Eurocodes and specific country annex.
- Location Poland





Insect Infestation

- Silos infested with insects
- Elaborated products with toxic substances
- Aeration study and calculation of the existing installations
- Chiller system proposal
- Cleaning of silo, catwalks and roof proposal
- Fumigation proposal
- Training of staff in chilling methods and TMS interpretation.
- Management of storage incidents (heated crops and infestations) in the form of online Tech support team that is available
- Location UAE



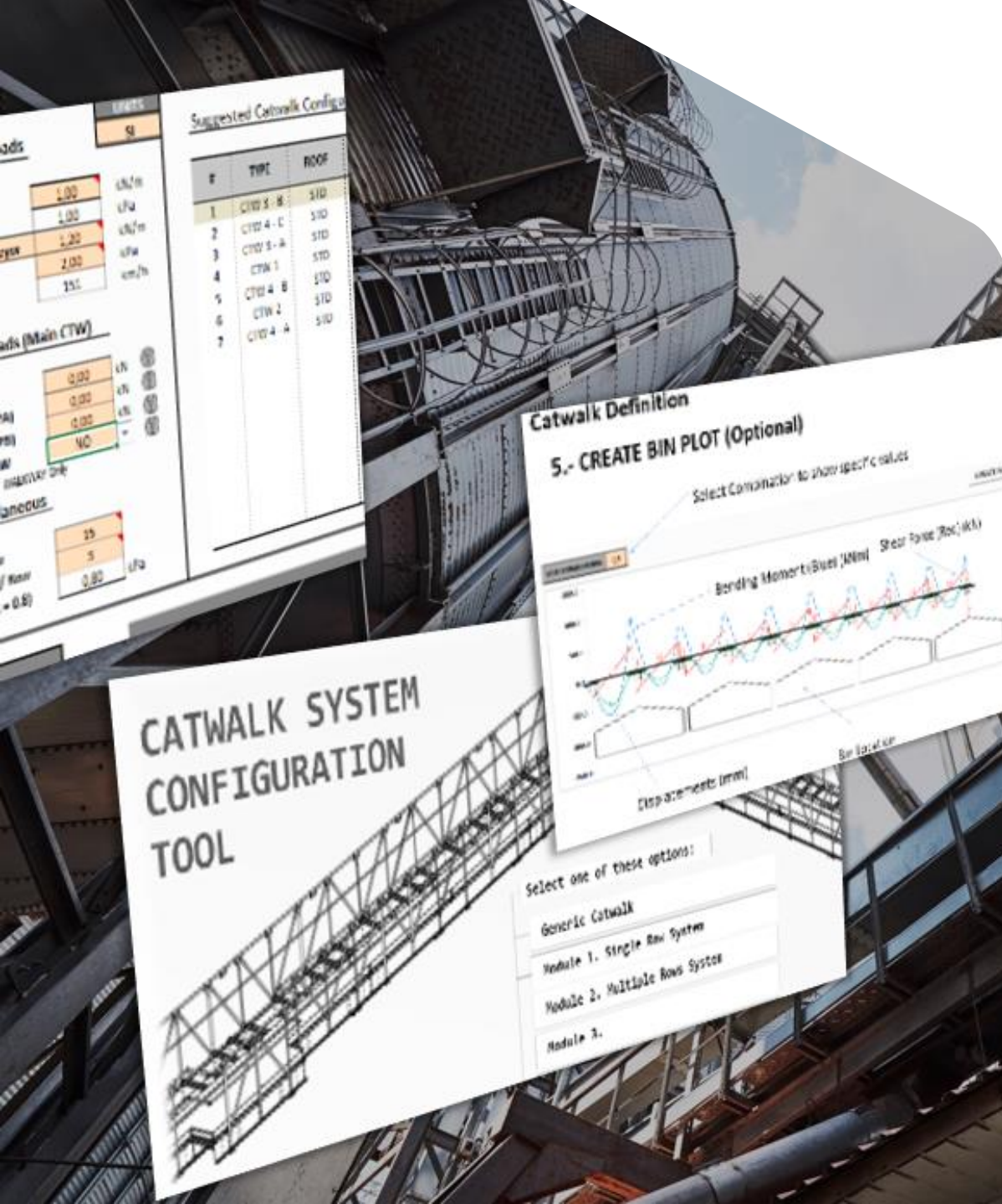
Silo Failure and Collapse

- Silo plant of international grain trader
- Assistance after silo failure
- Accident analysis and statically calculation advise.
- Bended silo due the use of FIFO unloader for rape seed meal.
- Dismantling process advice
- Location Germany



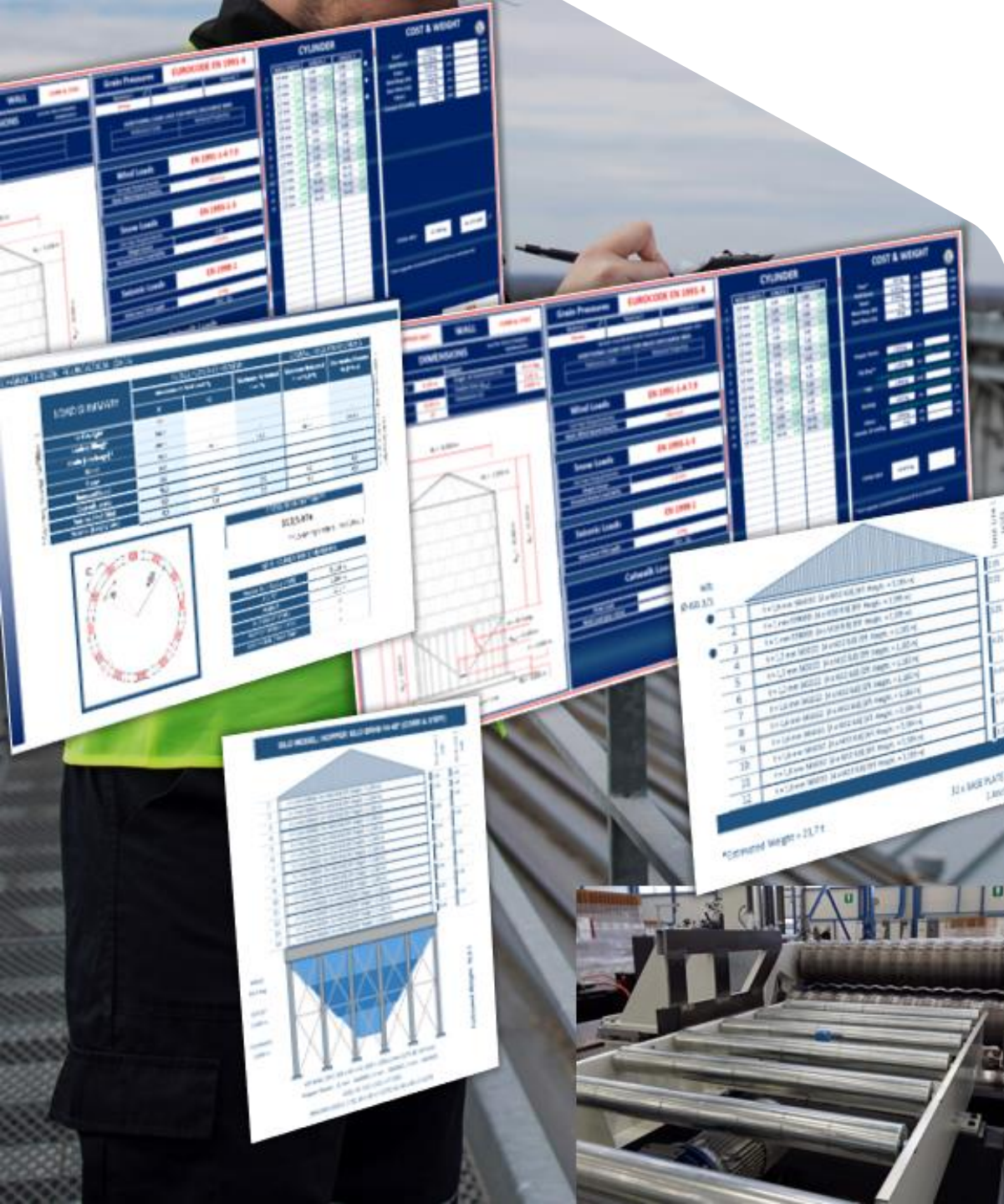
Silo Catwalk Design

- Design of complete new catwalks system package
- Calculation tool for silo catwalks
- Configuration tool for sales & engineering.
- Inputs masks with loads, type of silos, conveyor loads, result in a best technical / most economical proposal for the customer and fully norm compliant
- Tool returns full BOM, can be linked to ERP
- Assistance for machine tooling selecting
- Location: Manufacturer origin Canada



Grain Silo Design Review

- Flat and hopper bottom design review
- Design, development and implementation of analytical calculation tool for grain silos
- Eurocode and ANSI norms, including snow, seismic and snow loads to various norms
- Returns full set of technical / commercial information
- Weights by parts
- Full costing & Sales pricing
- Bill of materials (BOM), suitable for ERP integration
- Analytical calculation report suitable for authorities approval
- Foundation loads
- Wall sheet roll forming line definition & acquisition
- Location: International silo manufacturer EU



Silo Plant Design Study

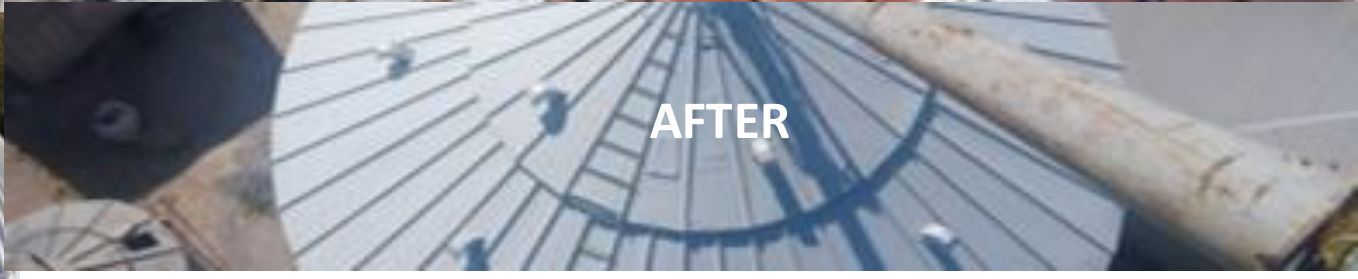
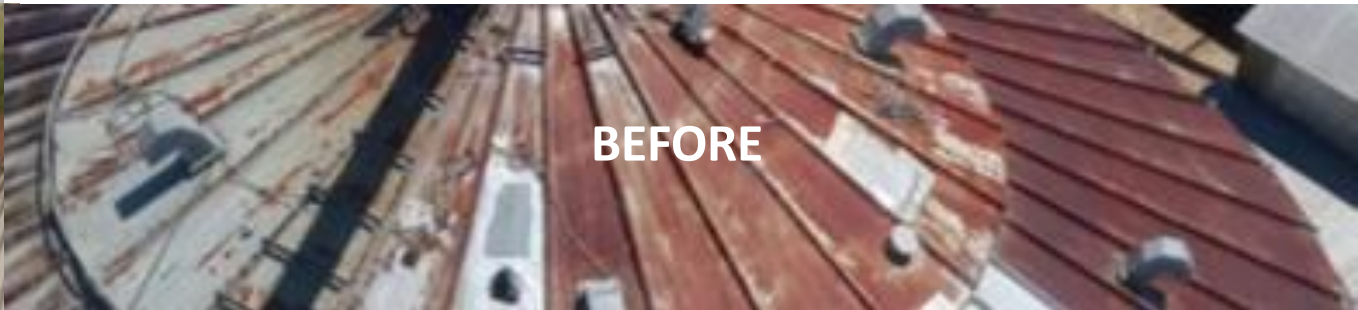
- 100 000 tons RICE storage
- Preliminary plant design, under specific crops consideration
- Basic material list
- Preliminary budgeting for Business Plan Evaluation
- Detailed planning proposal for further action plans, including:
- Study of electricity / energy in the area
- Nearby infrastructures
- Architectural drawings
- Soils analysis for civil works
- Location Mozambique, corporate investor

100 000



Silo Coating and Sealing

- Special silo coatings to protect silo and silo content from direct sun **impact** and heating effects. Reduced temperature variations
- Silo coating to protect and / or recover from corrosion.
- Silo coating and sealing for improved fumigation processes.



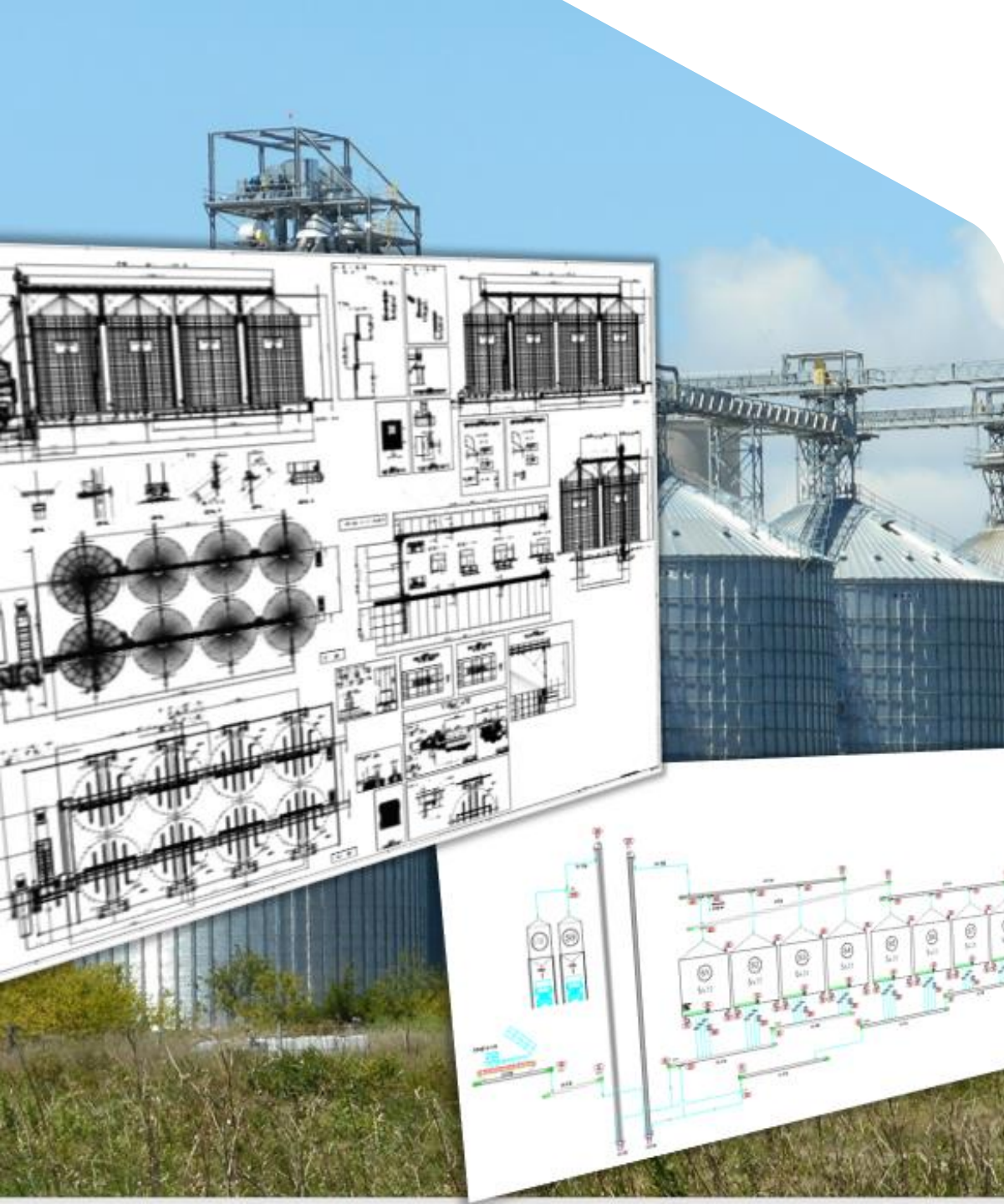
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- Seismic factors to be considered in calculations in the example of “Philippines”
- Comparison ANSI – EU Codes in silo calculations
- Location various international specialized magazines

Plant Design and Supply

- 30 000 ton silo plant
- Full silo plant design
- Silos, catwalks, handling equipment, steel structures, automatization, scales, bellows
- Manufacturing
- Supply
- Project Management
- Architectural drawings & foundation loads
- Interphase coordination with local civil work contractor
- Erection supervision and commissioning
- Location: Morocco, flour mill

30 000 MT



Plant Design and Supply

- 240 000 tons silo plant
- First basic design
- RFQ Lay out
- Final lay out
- Calculation, manufacturing and delivery of silos and structures
- Catwalk and tower design to 500 tons/hour equipment
- Accommodation to local seismic and snow load norms
- Project management: Deliveries, erection, architectural drawings, tower design, third party full equipment integration, erection supervision
- Location; Port Odessa, Ukraine

240 000 MT 



Silo Inspection and Maintenance

- Site inspections
- Silo nondestructive testing
- Silo repair with rope access
- Silo cleaning and hygienization
- Re Sealing of silos base and bolts
- ReSealing of vertical and horizontal joints
- Corrosion elimination on roof and cylinder
- Special coatings for temperature reduction
- Settlement checks silos and towers
- Location: Various sites, world wide



References and Examples

Aeration Study and Retrofit

- Aeration study on existing concrete silos
- Performance evaluation of different manufacturers fans
- Proper fan proposal base on silo geometry, crop type, fan performance curve
- Min. aeration surface study
- Retrofit proposal for full floor aeration systems
- Retrofit proposal for fully perforated ventilation cones
- Location: South Africa



Grain Handling Equipment Design

- Development of handling equipment
- Performance improvement of existing equipment
- Maintenance of installed equipment
- Engineering and development of new equipment
- Bucket elevators, chain conveyors, belt conveyors
- Calculation of power needs
- Selection of chains, buckets, belts, liners
- Calculation on safety factors of different components
- Grain dryers
- Manufacturing drawings
- Location: Egypt



Silo Operations

- Non free flowing product stored in grain silo
- Emergency emptying proposal
- Study of appropriate storage and unloading system
- Silo structural review
- Installation and set up supervision
- Location: Africa



Grain Silo Plan Design and Supply

- 2 x 1500 tons flat bottom silos
- 2 x 500 tons hopper bottom silos
- Basic design
- Architectural drawings and foundation loads
- Assistance to civil work contractor
- Manufacturing,
- Supply and installation
- Project management, integration of 3rd party delivered handling equipment.
- Full calculation report for authorities approval (required for building permission and commissioning)
- Location Cooperative, Germany

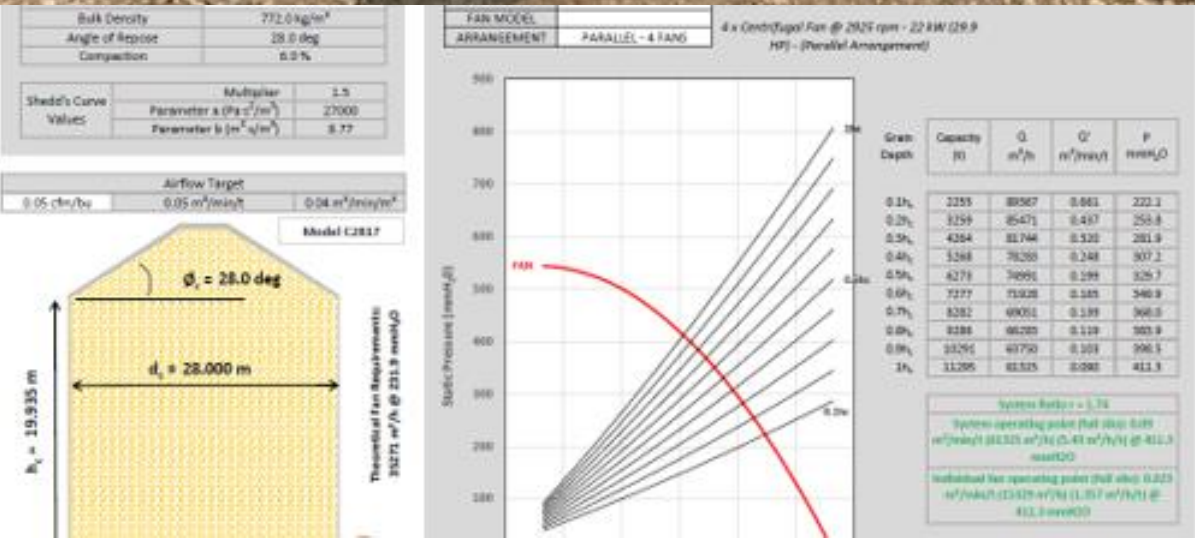
2x1500/2x500 MT



References and Examples

Aeration Study Various Locations

- Study of appropriate fans for grain silo aeration
- Acquisition of various fan performance data of various manufacturers
- Calculation of aeration performance based on
 - Silo geometry
 - Product to be stored
 - Fan power, performance curve and fan working point.
- Selection of appropriate fan
- Location: Various worldwide



Fumigation + N2 Fumigation

- Standard Fumigation based on Ph gases
- Fumigation methodology based on controlled Nitrogen atmosphere
- The use of nitrogen in the storage of cereal grains is not subject to phytosanitary approval, as no active ingredient is available.
- Effectivity is by the displacement of oxygen
- The germination capacity of the grain is not negatively affected
- Study of metal silo sealing methods for improved fumigation effectivity
- Location: various



Aerial Inspections Various Locations

- Aerial inspection of silo plats
- Internal and external aerial silo inspections
- Approved and certified pilots
- Assessing the amount of grain stuck to the walls and ladders
- Assessing the condition of the vertical hanging temperature cables
- Examining the base concrete and pit concrete structure
- Inspecting the roof feeding port
- Looking for corrosion and damage to the overall bin
- Looking for holes in the walls and roofs of the bin



Corrosion inside a grain bin

Silo Cleaning and Hygienization

- Silo cleaning & hygienization projects, of bulk feed tanks (farm silos), grain silos and other vertical tank (meal silos).
- Control/prevent growth of fungi, bacteria, insects and other sources of biological contamination from previously stored grain lots.
- Eliminate crosscontamination of products.
- Eliminate adhesions of products on the wall of the silo, which are nests of insects, bacteria and other sources of cereal infestation (Mycotoxins).
- Cleaning of adhesions to uncover areas of the silo that may need maintenance, and/or repairs



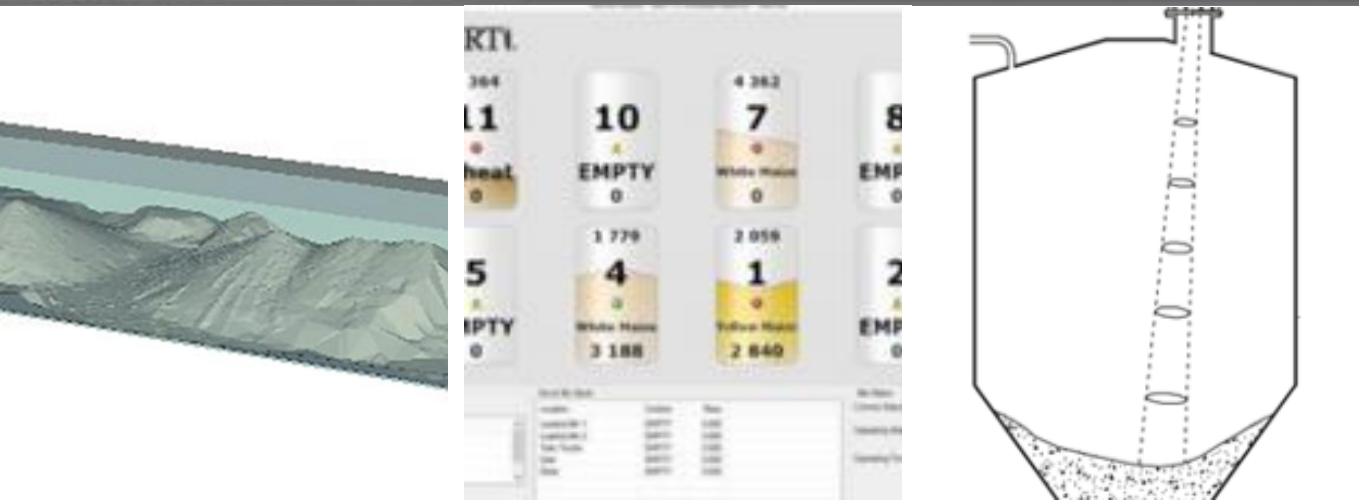
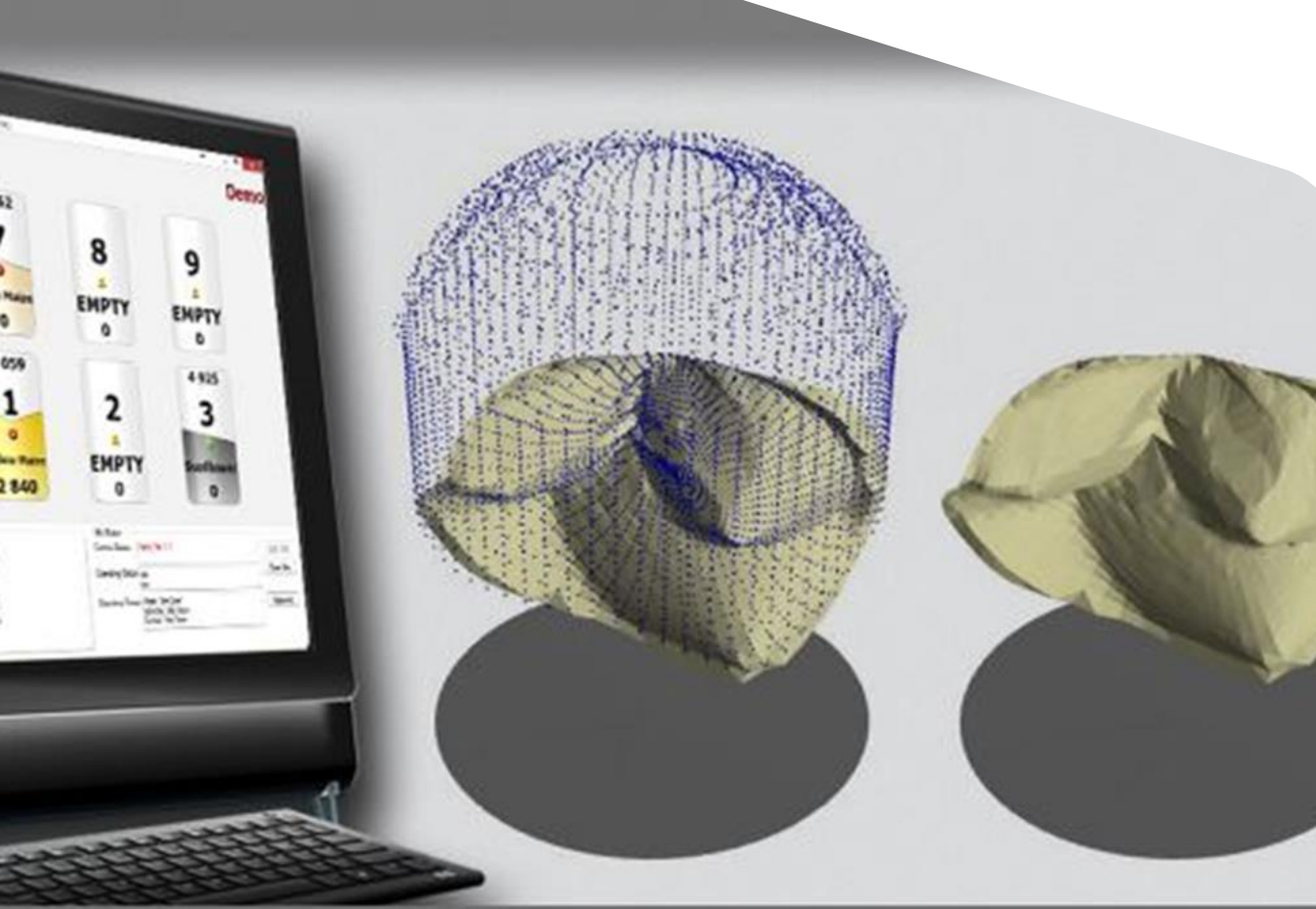
Alternative Storage Solutions

- Alternative storage solutions
- INOX Steel tanks
- Silo Bunkers
- Mobile farm silos / Grain Dams
- Square silos
- BFT's and water tanks



Continuous Level Monitoring & Inventory Management Systems

- Continuous level measurement
- Inventory management systems
- Silo, farm silos, bunkers & stockpiles
- Theft control
- Reconciliation between books and stock, daily
- Awareness of inventory, storage conditions product quantity and quality
- Laser & radar based systems
- Location: Various Worldwide



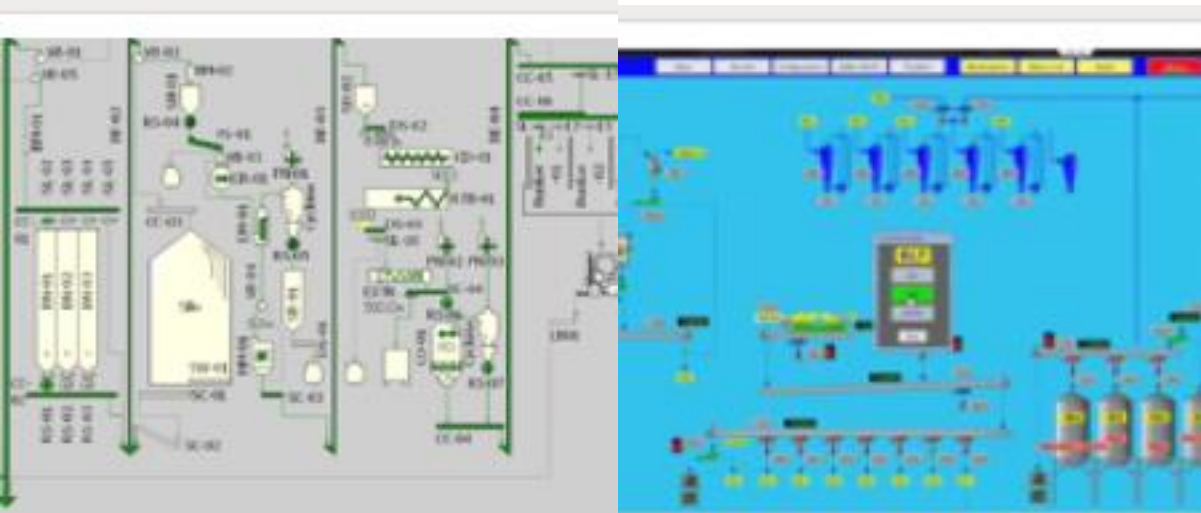


(Retrofits & Upgrade for existing facilities or greenfield projects)...



Plant Automation

- Intake installations and air filters
- Discharge chain conveyors
- Screw conveyors
- Bucket elevators
- Cleaners / Precleaners
- Product sensors
- Pipe magnets
- Distribution chain conveyors
- Pneumatically or manually controlled outlet slides
- Silo discharge equipment
- Valve boxes, slides and pipework
- Centrifugal fans and chillers



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