



Inspection, testing, and certification services

Bulk Materials Handling and Mining Equipment

Keeping assets operationally profitable

MGA Engineering offers a comprehensive portfolio of inspection, testing and certification services for complex bulk material handling equipment in the mining, marine, energy, and transportation sectors.

These services are designed to keep the assets operating profitably *throughout their economic life*.

The services are aimed squarely at risk mitigation: risks of failure, to productivity, to health, safety and the environment, to reliability, to budgets, and to shareholders' returns on investment.

Their common objective? To extract the maximum economic life out of operating assets.



Equipment Classes

BULK TRANSFER

- Single-boom spreaders
- Mobile stacking bridges
- Transport crawlers
- Stacker and reclaimers (single & combined)
- Bucket wheel reclaimer (boom & bridge)
- Scraper, drum, and portal reclaimers
- Portal and bridge-type scraper reclaimers
- Ship loaders & unloaders
- Grab type ship unloader
- Circular storage with stacker/bridge reclaimer

BULK TREATMENT

- Crushing plants
- Breakers and high-pressure grinding rolls
- Roll crushers and double roll crushers
- Belt linear screens
- Hard rock sizers
- Slurries plant and tailings
- Primary separation cells and flotation cells
- Ganulators
- Vacuum belt filters for dewatering

EXCAVATORS

- Bucket chain excavators
- Bucket wheel excavators

TRANSPORT

- Apron feeders
- Belt conveyors/feeders
- Mobile conveyor bridges
- Mobile transfer conveyors
- Tube conveyor
- In-plant conveyor systems
- Pipe conveyor systems
- Steel belt conveyors

FACILITIES

- Wagon / truck loading
- Wagon unloading / tripper
- Rapid train load-out station
- Storage pits
- Tanks and reservoirs
- Pressure vessels and bullets
- Process piping
- Pipe racks
- Steel structures

Mobile equipment design standards and load testing

► Design Standards

- FEM Section II (Fédération Européene de la Manutention (F.E.M.) Section II, Document 2 131/2 132 (1997) “Rules for the Design of Mobile Equipment for Continuous Handling of Bulk Materials”)
- SO/5049-1: 2nd Edition 1994-07-01 “Mobile Equipment for Continuous Handling of Bulk Materials. Part 1 - Rules for the Design of Steel Structures”
- AS 4324.1 Mobile equipment for continuous handling of bulk materials - General requirements for the design of steel structures (on occasions)
- DIN 22261 Excavators, Spreaders and Auxiliary equipment in opencast lignite mines is also used under special conditions (not in recent projects for the Canadian projects).
- **Shiploaders: Load testing is typically carried out according to:**
 - Client proof load tests (Contract specs)
 - Canada: Cargo, Fumigation and Tackle Regulations, SOR/2007-128
- **Other equipment such as Stackers and Stacker Reclaimers are proof load tested according to Client contract specification**

Conveyor design standards and load testing

Conveyors

- CEMA
- Sidewinder, Newton simulation software
- Safety Inspection Checklist-General
- Safety Check List - Controls (Engineering)
- MGA safety References for Conveyors
- User's Guide to Conveyor Belt safety - Commission de la santé et de la sécurité du travail du Québec
- National Safety Council guidelines (Parts 1 and 2)

Elements of Inspections



Safety related (OHS and Design Standards)

Prevent catastrophic failures
Prevent personal injuries and or health



Machine operation and efficiency (Engineering and Design Standards)



We use the same standards for design and testing



We also supplement our inspections by other requirements dictated by the AHJ and plant/mining operation

Structural Integrity



Analysis and simulations (3D structural modeling)



API 579 **Fitness for Service Assessments**



CSA S16-014-**Design of steel structures**



AISC 360 **Specification for Structural Steel Buildings**



(ASCE/SEI 7-16) **Minimum Design Loads and Associated Criteria for Buildings and Other Structures**



IIW: **International Institute of welding**



Eurocodes (when needed)



Client standards (e.g. AA)

In-service Condition surveys

Fitness-for-service inspections & evaluations

In-service conditions surveys:

- ▶ We implement API/ASME 579 to evaluate flaws and damage associated with in-service operation of the equipment structural components.
- ▶ Checklists cover every component of the machine.

Fitness-for-service is typically assessed for:

- ▶ Crushing Plants (hoppers, apron feeders, crushers, etc.)
- ▶ Shiploaders
- ▶ Stackers and stacker reclaimers
- ▶ Other mobile or semi mobile equipment

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