



PROCESS ENGINEERING

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Krech Ojard Engineers provide process engineering to a vast range of industries, including: oil and gas, mineral and mining, agriculture, manufacturing, and transshipment and transload facilities. These industries require advanced material processes for goods such as grains and food, ores and slurry, and varying particulates and fluids.

Krech Ojard Process Engineers focus on the design of our clients' entire process, operation and control, and optimization of mechanical, chemical, and computer processes, including maintenance, to provide savings in costs, time, and waste, while improving safety.

TOOLS FOR A BETTER PROCESS

Process design: synthesis of energy recovery networks, air contamination or dust abatement systems, chutes, conveyor systems, material flow, load and unload systems.

Process control: model predictive control, controllability measures, robust control, nonlinear control, statistical process control, process monitoring, and thermodynamics-based control.

Process operations: scheduling process networks, multi-period planning and optimization, data reconciliation, real-time optimization, flexibility measures, fault diagnosis.

Supporting tools: sequential modular simulation, equation based process simulation, global optimization, three dimensional modeling for spacing, fit, and dimensioning custom fit applications.



FINE ORE SURGE CONVEYOR

Minnesota

Krech Ojard & Associates has provided engineering services for a large pellet plant operation in northern Minnesota. Their product is taconite pellets, sold and shipped to steel plants around the world. They currently have five lines of fine ore running into the concentrator building, where it is milled, separated and screened into concentrate before being sent into the pellet plant.

KO provided engineering services for a feasibility study of installing new feeders and new conveyors in the reclaim tunnel underneath the fine ore surge pile. This new equipment will be used to reclaim the current "dead" storage located at the east end of the facility.

3D modeling of the facility was utilized during the review and design phases of the project.

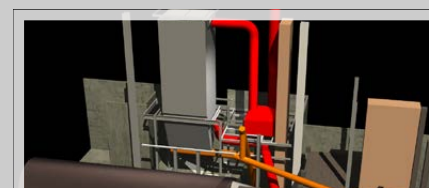


FLOW METER UPGRADES

Wisconsin

Designed and coordinated flow control valves on line #1 of a Wisconsin Terminal. Further projects

involved PCV Vibration reductions and flow metering on extended lines at the terminal. Engineering staff utilized 3D modeling for the design of the flow meter upgrades. Animated process flow of existing and new designs was also utilized. The client was having difficulty regulating the flow between meters because there was no actuated flow control valves. Existing steps involved manual pinching of meter valves. By way of the upgraded flow meters, the client's control center will be able to manipulate flow through the meters remotely, which offers a number of benefits to the client.



GRAYMONT

Superior, Wisconsin

Krech Ojard was hired to design all of the refractory, process, and storage equipment, on pile and helical anchor

deep foundations, to support the installation of a new kiln #5, and other plant upgrades at Graymont's Superior, Wisconsin limestone plant. The new kiln is a state of the art high efficiency preheater lime kiln. Additional work focused on development of "Balance of Plant" process flow, conveyor systems, silo dust control, dust collector upgrades, crushing and screening operations, material re-claim tunnel, integrated rail and truck load-out systems, as well as significant structural modifications to existing buildings to support the new process equipment.



CONCENTRATOR DERRICK SCREENS STUDY

Minnesota

Provided engineering services for a large pellet plant operation in northern Minnesota.

Their product is taconite pellets, sold and shipped to steel plants around the world. In the concentrator building, crushed ore is milled and screened to extract concentrate for pellet production. This process uses vibratory screens to size the milled ore. The plant currently uses ten derrick screens in the concentrator. KO provided engineering services for a feasibility study of installing two additional derrick screens to improve screening rates and efficiency. This study included the development of 3D models to aid in visualization of the equipment and spaces.

FRAC SAND FACILITY

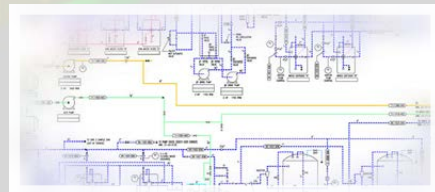
Chippewa Falls, Wisconsin

Krech Ojard & Associates was retained for engineering services for the design and construction of a new frac sand plant. Krech Ojard performed services from the preparation of preliminary flow sheets through final construction documents and project management for this 2.6 million tons per year frac sand processing facility.

Upon completion of flow sheets, Krech Ojard began design of the plant layout and process. Our Mechanical, Structural, and Electrical Groups worked together to ensure that interferences were minimized. Design components for the plant included:

- Plant Layout
- Foundation and Structural Steel Design
- Conveyors and Elevators
- Material Handling Equipment
- Sand Processing Equipment
- Piping
- Rail and Truck Dumps
- Raw and Processed Sand Storage
- Electrical Power
- Control Systems

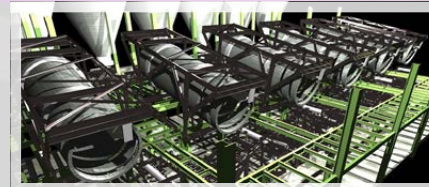
The Chippewa Falls frac sand facility was a fast track design-build method of delivery requiring close coordination between the owner, contractor and Krech Ojard.



PROCESS & INSTRUMENTATION DIAGRAMS

Various Locations

Recruited to prepare Process & Instrumentation Diagrams (P&IDs) for a taconite processing facility's power plant. All processes are color coded to a uniform table and completed in CAD for easy updating, review, and use by client staff. Krech Ojard professionals followed a process of reviewing existing drawings, conversion of existed P&IDs, creating enhanced standards and new P&IDs, and finally field verifying accuracy.



BALLING DRUM REPLACEMENT STUDY

Minnesota

Performed a feasibility study at a northern Minnesota iron ore mine to improve

their taconite balling process. The project involved the replacement of two existing ten foot diameter drums with two twelve foot diameter drums, reworking feed and takeaway conveyors, and replacing the existing roll screens with wider, longer roll screens. The current equipment could be difficult to maintain with limited access, so a key element of the design is to improve access to the new equipment. 3D modeling of the entire balling process was the approach taken by Krech Ojard to tackle this problem. 3D modeling allows for previewing installed additional equipment to test allowances, connections, spacing and more.



INTERFLOOR VIETNAM

Vung Tau, Vietnam

KO Structural and Mechanical Groups teamed to design a truss supported 150m

long tripper conveyor with integral shuttling cross conveyor designed to fill 96m wide bulk storage bays with various grain commodities. Krech Ojard created fully integrated 3D models of the conveyor to simultaneously resolve interferences, create fabrication drawings and part take offs. 3D modeling combined Imperial and Metric based designs to allow for simultaneous fabrication in US and Pacific venues.

A low-angle, upward-looking photograph of large industrial pipes and scaffolding, rendered in a monochromatic orange color. The pipes are thick and cylindrical, with various joints and supports visible. The scaffolding is a complex network of metal beams and ladders on the left side. The background is a clear, light orange sky.

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