Enhancing Cement Blending Capabilities at a Cement Producer

Customer: Canadian Cement Producer
Solutions Provider: Cyclonaire Pneumatic Conveying, John Elliot, Business Development Manager – Cement

Overview

The cement industry in North America is evolving as the market shifts towards project specific blended cementitious products. Traditionally, large cement production facilities blend cementitious materials at scale. Smaller, specialized batches are not possible due to the nature of continuous kiln operations. Silo storage banks are often large and without blending capabilities. As a result, smaller third-party terminals which have agile blending capabilities are offering custom cement blends and capturing significant market share.

One of North America's leading Cement Producers recognized the opportunity and invested in the capital equipment necessary to add blending to their existing truck loadout silo structure. This allowed them to meet market demand as it shifts to boutique blends and smaller, customized orders, sometimes as small as a single truckload. Cyclonaire provided the advanced blending solution to enable the producer to regain its competitive edge and generate additional revenue streams.

Impact and Severity of the Problem

The inability for the Cement Producer to offer boutique cement blends resulted in the following consequences to their operation:

- **Loss of Revenue**: The producer lost out on the opportunity to provide value-added services, leaving the door open for competitors to fulfill these market needs.
- **Market Share**: Third-party, end-of-line terminals with blending capabilities were gaining ground in a market that they had traditionally dominated.
- **Customer Expectations**: As demand for more specialized cement products increased, the lack of blending capabilities had a negative impact on their ability to meet these new customer expectations.

While the problem was not critical to the plant's core operations, it posed a medium severity threat due to the revenue loss and emerging market competition. The problem had been persistent for over a year, and a solution was urgently required to regain lost - as well as - at-risk market share.

Cyclonaire's Blending Solution

Cyclonaire engineered a state-of-the-art blending system tailored to the specific needs of the producer. The system provided the flexibility required to meet market demand while seamlessly integrating into the producers existing operations.

System Overview

- **Blending Capabilities**: Cyclonaire's solution features a blending system capable of pulling from up to six silos, blending at a rate of eighty-eight (88) tons per hour (TPH). This high throughput allows the producer to manage a wide range of order sizes efficiently, from small boutique orders to larger industrial requests.
- **Loadout Efficiency**: Once blended, the cement is transferred directly to a loadout spout for easy delivery to trucks, ensuring smooth and rapid dispatch for customer orders. Alternatively, via a diverter valve, blended product can be delivered to a silo for large campaigns of blended products.

Advanced System Integration

To ensure seamless operations and enhanced control, Cyclonaire's system includes:

- **Batch Information**: The system accurately calculates the blended product ratios and final weight delivered to the truck, without a scale under the truck. Final weight check is performed with the producer's truck scale to for trade purposes.
- **Quality Control (QC) Sample Port**: The solution includes a QC sample port, enabling them to assess the quality of each blend, ensuring customer specifications are met.
- **Recipe Management**: The blending system features recipe management capabilities, allowing the producer to customize and automate blends to meet specific customer requirements efficiently.
- **ERP Integration**: The system writes to an SQL database which is maintained by the plant for integration to the existing Enterprise Resource Planning (ERP) software. This integration provides real-time commercial data for sales and inventory management, ensuring that they can maintain optimal operational oversight while offering new products.

Implementation and Commissioning

Implementation of Cyclonaire's blending system began in August 2023, with commissioning concluding in December of 2024. Early production efforts have been positive, with the system already performing as designed for commercial sales.

Customer Feedback

Though the system is in the early phases of production, initial customer feedback has been positive. Due to the diligent efforts of the Cyclonaire project team, the system was operational for a trial run in late August. This allowed the producer to showcase the system's capabilities to their President during a recent visit. Accuracy of the blended product has met or exceeded the specifications set out in the design stage as verified by the producer's laboratory testing equipment.

Expected Outcome and Future Benefits

The producer now has a robust, efficient blending system capable of delivering boutique blends at high throughput rates. This will not only meet current market demands but also position them as a competitive player capable of capturing lost market share. The producer will also be able to provide value-added services to customers, generating new revenue streams from the cement blending process.

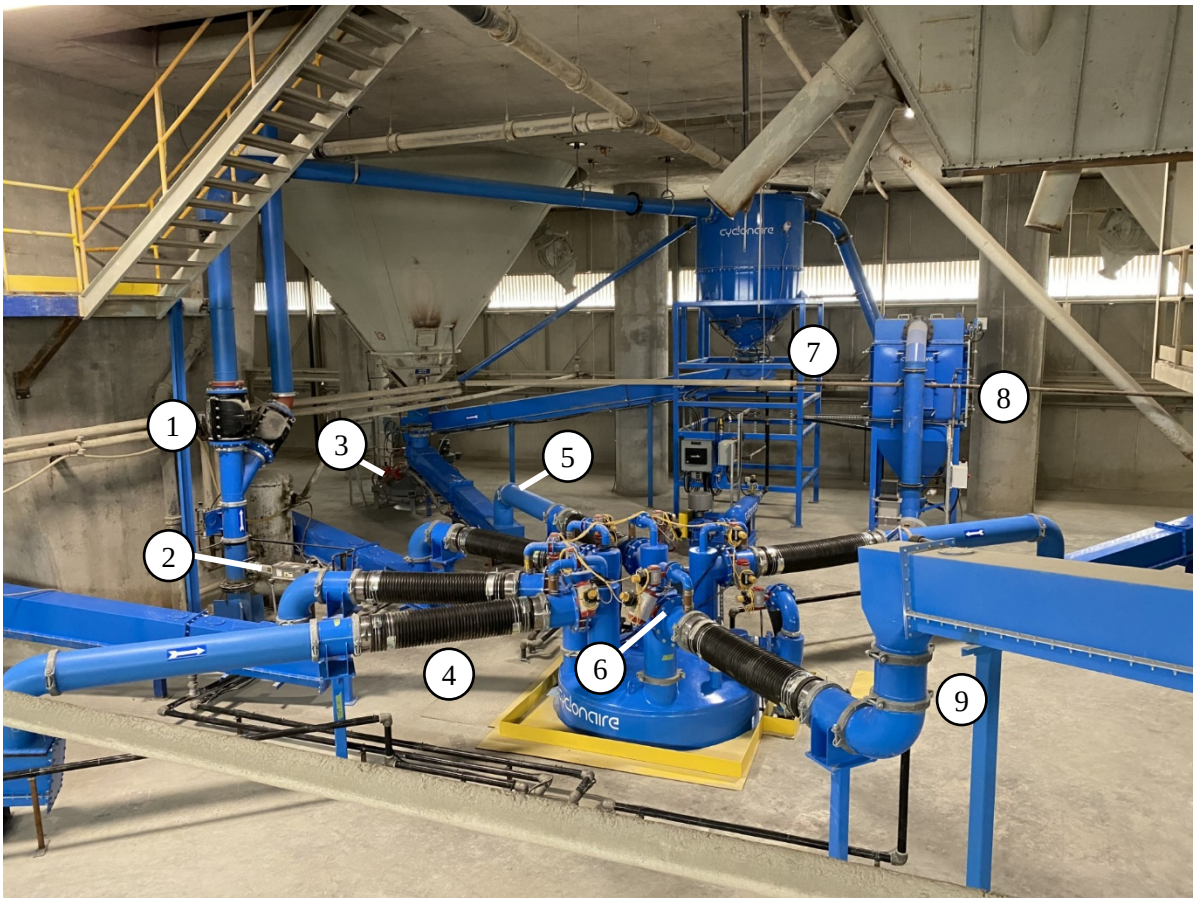
Long-Term Benefits

1. **Increased Revenue**: The ability to offer custom cement blends will help recover lost revenue and attract new business opportunities.
2. **Operational Efficiency**: The blending system's integration with the cement producer's ERP system will improve operational efficiency, reducing load times and minimizing human error.
3. **Enhanced Customer Satisfaction**: The system's QC sample port and recipe management capabilities ensure high-quality, consistent blends, leading to higher customer satisfaction.

Conclusion

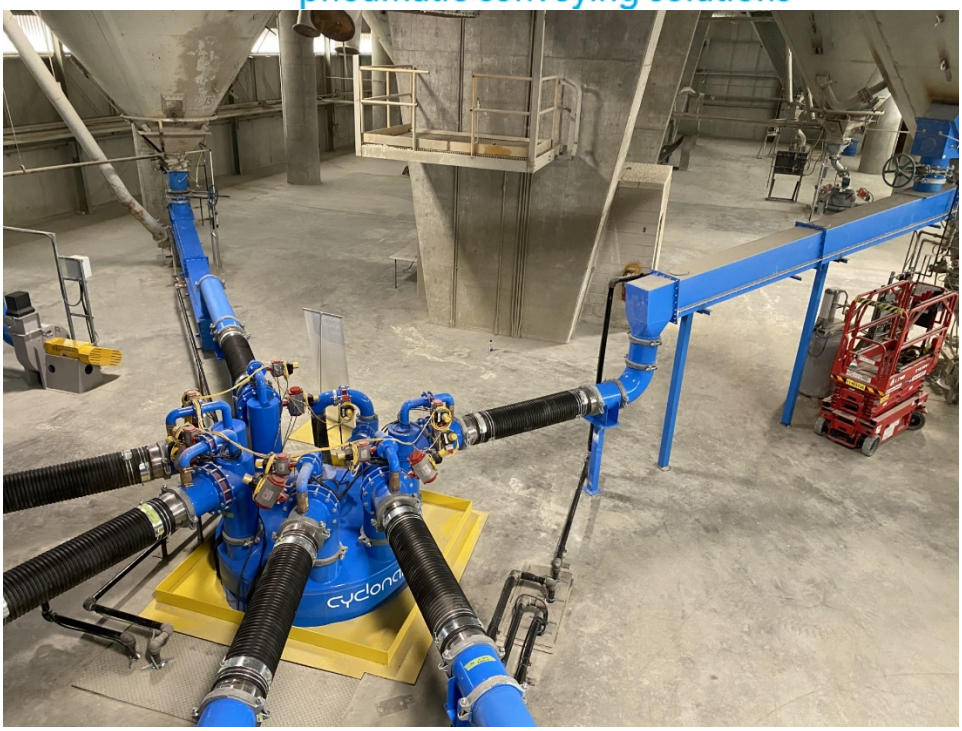
Cyclonaire's blending system has provided the Cement Producer with the tools it needs to compete in an evolving market. By enabling the production of boutique cement blends, Cyclonaire has not only addressed the producer's immediate problem but also provided a scalable solution for future growth. The success of this project highlights the importance of innovation in the cement industry and demonstrates how Cyclonaire's tailored solutions can help companies remain competitive in changing market conditions.

System Pictures



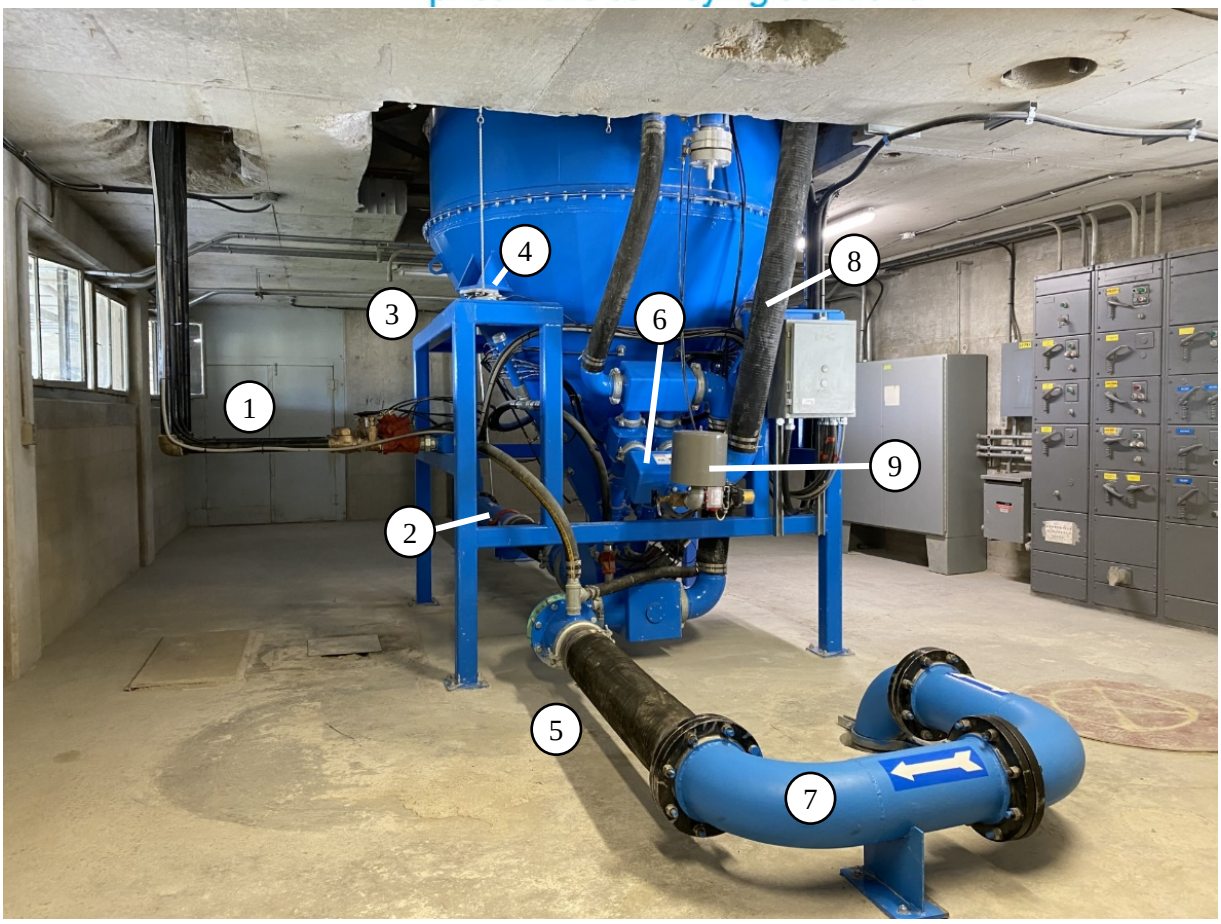
Upper Level:

1. Pinch Diverter Valve Assembly
2. Automatic Sampler
3. Dustless Load Out Spout
4. Inlet Isolation (Flex)
5. Vacuum Lift Air Chute Pickup
6. Inlet Valve – Full and Dribble Flow
7. Filter Receiver
8. Dust Collection
9. Gravity Air Chute Pickup



Upper Level (Top View)

Upper Level (Side View)

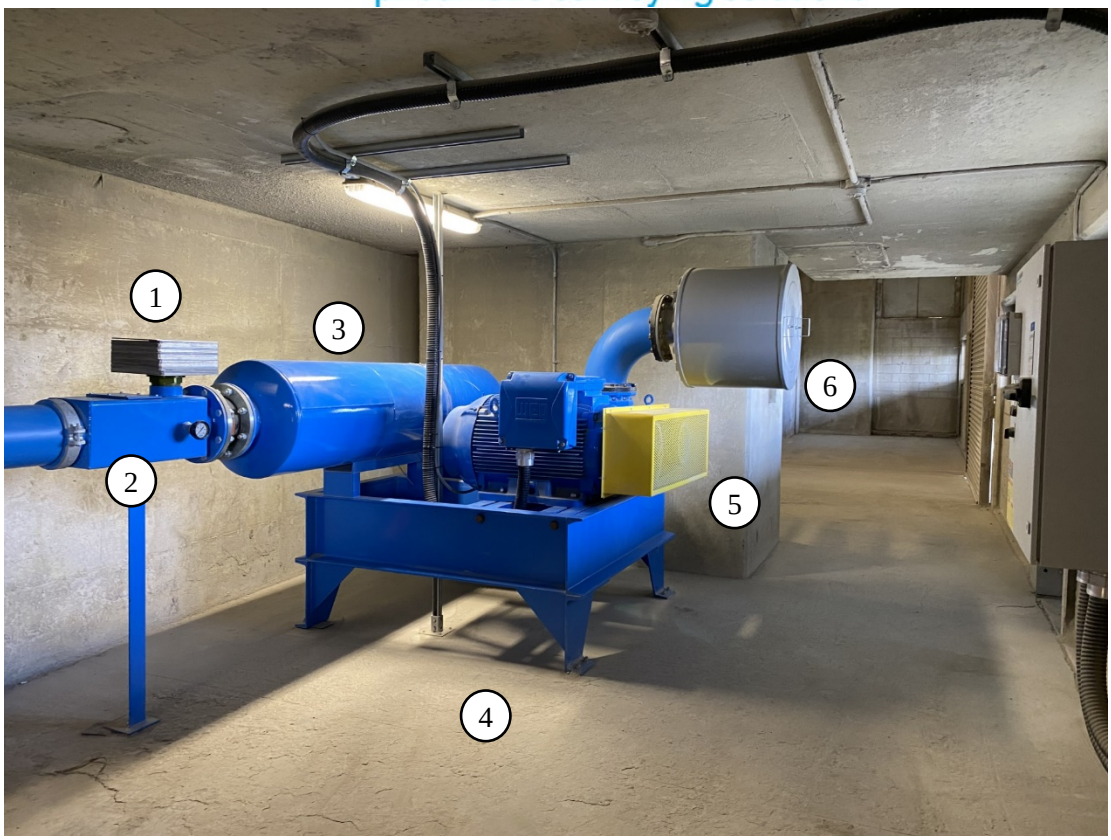


Middle Level:

1. Source & Air Chute Aeration
2. Blended Product Discharge
3. Aerated Blending Hopper
4. Load Cells
5. Air Inlet Isolation (Flex)
6. Induced Vacuum System
7. Convey Air
8. Suction Hose
9. Vacuum Breaker Inlet

Middle Level:

1. Control Panel
2. Instrument and Solenoid Panel
3. Discharge Manifold
4. Source & Air Chute Aeration
5. Product Outlet Isolation (Flex)



First Level:

1. Weighted Relief Valve
2. Check Valve
3. Silencer
4. PD Blower Package
5. Sheaves
6. Inlet Filter / Silencer

END