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CASE STUDY

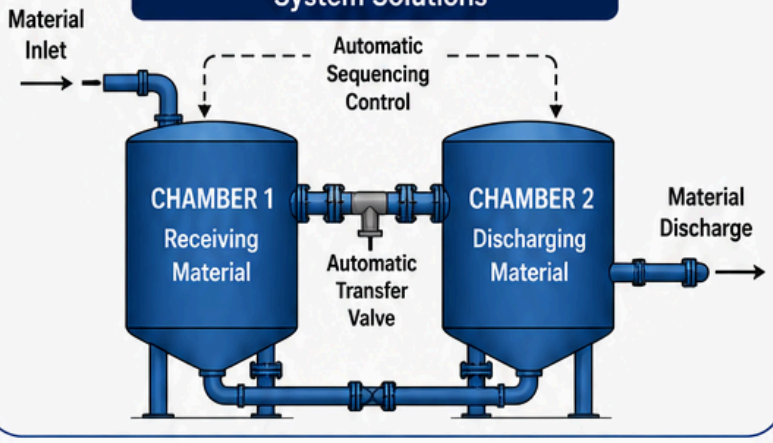
WHY TWO CHAMBERS PERFORM BETTER THAN ONE IN BLASTING SYSTEMS

A Case Study on Improving Productivity, Continuous Material Transfer and Operational Efficiency in Abrasive Blasting and Recovery Operations using Dual-Chamber Systems

Author:
Utsav Malankiya
Attending Master of Science in Mechanical Engineering
Wayne State University
Detroit, MI, USA

Figure 1: Two-chamber Performance in Blasting Systems

Figure 2: Dual Chamber Recovery System Solutions



INCREASED PRODUCTIVITY
Up to 25% higher production rate.

CONTINUOUS MATERIAL TRANSFER
Eliminates downtime during discharge cycles.

IMPROVED RECOVERY EFFICIENCY
Maintains consistent vacuum performance.

LOWER OPERATING COSTS
Reduces overall operational expenses.

BETTER EQUIPMENT UTILIZATION
Maximizes equipment performance.

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176, Gokul Nagar, Kanadia Road,
Indore, M.P., India, 452016
8819881288
support@ijrtsm.com
www.ijrtsm.com

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www.ijrtsm.com
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Why Two Chambers Perform Better Than One in Blasting Systems

Figure 1: Two-chamber Performance in Blasting Systems

1. Overview

A contractor performing abrasive blasting and recovery operations was unable to resolve the productivity issues that arose during the material discharge interactions. The existing recovery system required periodic stops to empty the collected abrasive, which significantly slowed down operations and reduced efficiency.

This case study focused on the solution that could improve productivity and support continuous material transfer with the help of a dual chamber. The material transfer solution could move material between the pressure zones and does not interrupt the recovery process.

2. Problem Statement

The existing system utilizes a single dump discharge process, which fails to continuously transfer material and maintain the right vacuum conditions. Every discharge cycle interrupted the recovery process to some extent.

This system created several issues, which included

- The delays in the production
- Reduction in the aggressive recovery efficiency
- Equipment utilization becomes slower.
- Operating expenses were increased.
- Reduction in operational efficiency

3. Challenges

The contractor faced several technical challenges at the time of maintaining safe and reliable operations.

Below are some of the major challenges that the contractor faced.

- Maintaining the vacuum performance at the time of discharge
- Safely handle the pressure differences
- Reduction in material loss
- Improvisation of the recovery speed
- Increasing production without replacing major equipment is a key solution.

Another significant challenge was achieving this improvement without purchasing the larger recovery tank or completely replacing the equipment of the existing system.

4. Key solution

Figure 2: Dual Chamber Recovery System Solutions

The contractor upgraded the recovery system by incorporating a dual-chamber material transfer arrangement that can keep the material moving in a continuous manner.

4.1 Automatic chamber sequencing

The two chambers operated in sequence, with one receiving the material file and the other discharging it.

The benefit of doing this is

- There were continuous vacuum operations.
- Abrasive recovery in an interrupted way
- Material flow was improvised.

4.2 Pressure control system

Pressure-balancing mechanisms were installed inside a transfer chamber before it safely managed pressure differences at the time of discharge.

This is going to improve the

- Better safety control
- Material transfer in a smooth manner
- Recovery performance consistency

4.3 Flexible application design

The vacuum recovery unit could significantly integrate the solution with minimal modifications. This implementation makes the system simpler and cost-effective.

5. Outcome

After implementing the new transfer system, the contractor achieved the measurable improvements across the recovery operations as well as the blasting process.

The results of the upgraded system incorporate the following outcomes, like

- Higher production rate, which goes up to 25%
- Improvisation in the material handling performances.
- Reduction in recovery interruptions
- Improvisation in equipment utilization
- Operational expenses were significantly lower.

The contractor was able to improvise the overall project efficiency as well as reduce the delays at the time of the discharge cycles.

6. Key takeaways

Continuous material transfer plays a significant role in the productivity of blasting as well as aggressive recovery operations. Conventional discharge methods can minimize the efficiency by interrupting the operations whenever material needs to be dumped.

Key takeaway 1: Incorporating the dual-chamber transfer approach provides a practical solution for the contractors. This method can safely improve the production rate reliability of the system and does not require major equipment changes.

Key takeaway 2: This case study demonstrates how a contractor can upgrade the system and achieve better performance without going through the hefty new equipment cost. This solution can help achieve significant gains in efficiency and reliability.

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PIN: 452016
Landline: 07313145086
support@ijrtsm.com
ijrtsm@gmail.com
www.ijrtsm.com