

Improving Material Flow in Coal Mining

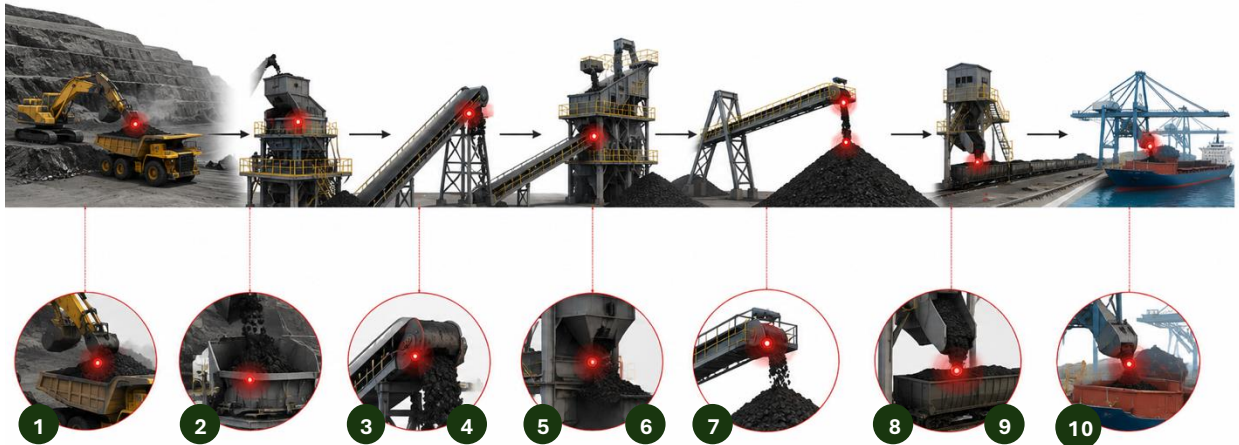


Reducing Build-up, Carryback and Flow Restrictions Across Material Handling Systems

1. Coal Material Handling

Coal is extracted using either **surface (open-cut)** or **underground** mining methods, depending on the depth and characteristics of the coal seam. Although extraction methods differ, all operations rely on an extensive material handling network to transport coal from the mine face to the customer.

Throughout this process, coal passes through multiple transfer points including truck trays, feeders, crushers, transfer chutes, conveyors, hoppers, silos, stackers, reclaimers, train loading facilities and rail wagons. Every transfer represents a potential restriction to material flow, making reliable handling systems critical to maintaining production, equipment availability and plant performance.



#	Process Stage	Australian Mining Term	Typical Operational Issue
1	Excavator loading truck	Truck Tray Carryback	Coal adhering to the truck body reducing payload and increasing cleaning requirements.
2	Primary Crusher Feed	Crusher Feed Hopper Build-up	Material bridging and restricted feed into the primary crusher.
3	Conveyor Transfer Point	Transfer Chute Build-up	Coal adhering to chute walls, reducing material flow and causing blockages.
4	Conveyor Belt	Belt Carryback	Material remaining on the return side of the belt, creating spillage and housekeeping issues.
5	Surge Bin / Silo	Bin or Hopper Hang-up	Material arching or ratholing, preventing consistent discharge.
6	Transfer Chute (CHPP)	Transfer Chute Blockage	Build-up causing restricted flow, production delays and shutdowns for cleaning.
7	Stockpile Conveyor Discharge	Stacker Carryback	Material adhering to discharge chutes and stacker components.
8	Train Loading Bin	Train Load-out Chute Build-up	Coal accumulating inside loading chutes, affecting train loading efficiency.
9	Rail Wagon	Rail Wagon Carryback	Coal remaining in wagons after unloading, reducing payload and requiring manual cleaning.
10	Ship Loader	Ship Loader Chute Build-up	Material sticking inside loading chutes, causing interruptions during vessel loading.

Material Handling Challenges

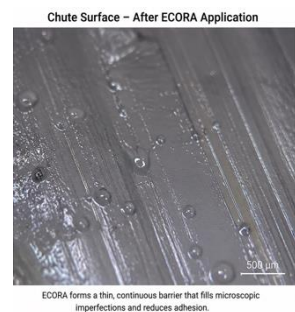
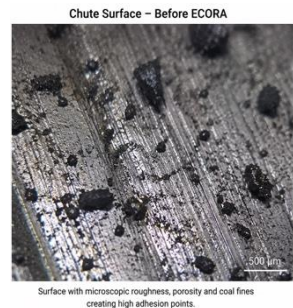


Understanding Material Adhesion, Where Build-up Occurs and How It Can Be Controlled

2. Material Handling Challenges in Coal Mining

Coal is one of the most challenging bulk materials to handle due to its variable moisture content, particle size distribution, clay contamination and the generation of fine particles during crushing and handling. **These characteristics significantly increase adhesion between the coal and equipment surfaces**, particularly under wet or humid operating conditions.

As material adheres to steel surfaces, build-up progressively develops inside transfer chutes, crushers, feeders, hoppers, conveyor transfer points, truck bodies and rail wagons. This often leads to flow restrictions, blockages, carryback, unplanned shutdowns, increased cleaning requirements and accelerated equipment wear. In severe cases, production must be interrupted to manually remove compacted material before normal operations can resume.



3. Engineering Approach to Improving Material Flow

ECORA is an engineered surface-conditioning solution developed to improve the flow characteristics of bulk materials throughout the mining process. Rather than acting as a lubricant, **ECORA penetrates microscopic surface imperfections and forms an ultra-thin protective barrier that reduces the adhesion forces between coal and steel.**

The product can be applied manually during trials or automatically through ECORA Jet, SmartJet or AutoJet systems integrated into normal operating routines.

Application frequency depends on equipment geometry, operating conditions and coal characteristics, with one litre typically treating approximately **25 m²** of surface area (reference). By reducing material adhesion at the source, ECORA promotes more consistent material flow, minimises build-up and reduces the need for manual cleaning interventions.

Coal build-up should not be considered an unavoidable consequence of mining. By addressing material adhesion at the source, mining operations can improve material flow, reduce unplanned cleaning, increase equipment availability and support safer, more reliable coal handling throughout the process.

Eliminating Chute Blockages

One coal operation experienced frequent build-up inside a transfer chute, causing repeated flow restrictions and requiring operators to stop production and manually remove compacted coal.

These interventions reduced equipment availability, increased maintenance exposure and introduced additional operational risk.

ECORA was applied directly to the internal chute surfaces following the recommended application protocol. The treatment created a low-adhesion surface that significantly improved coal flow through the transfer point.

Following implementation, material build-up was substantially reduced, manual cleaning requirements decreased and the chute operated with a more consistent material flow, improving reliability and reducing unplanned interruptions.

NOTE: This is considering a 793 truck with 200 tonnes capacity

How we worked



Step 1 – Operational Challenge

Transfer chute blocked by compacted coal restricting material flow.



Step 2 – Current Practice

Manual cleaning required to restore production.



Step 3 – ECORA Application

Application of ECORA Eco Release Agent following the approved protocol.



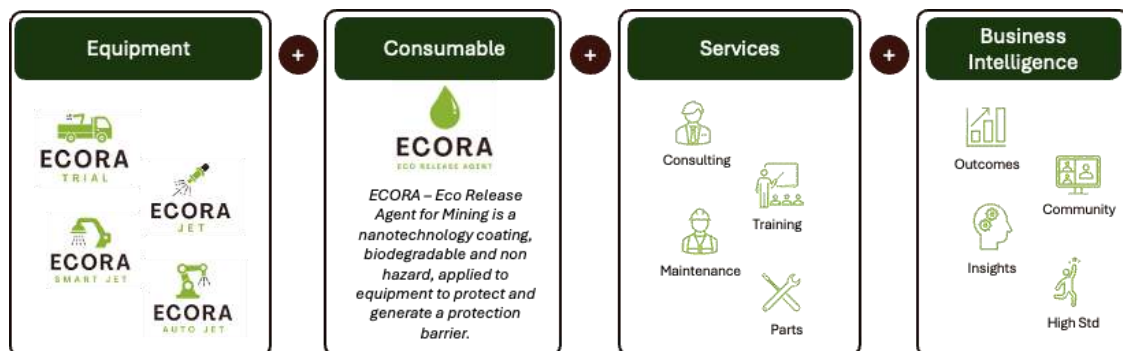
Step 4 – Operational Result

Improved material flow with significantly reduced build-up and fewer cleaning interventions.

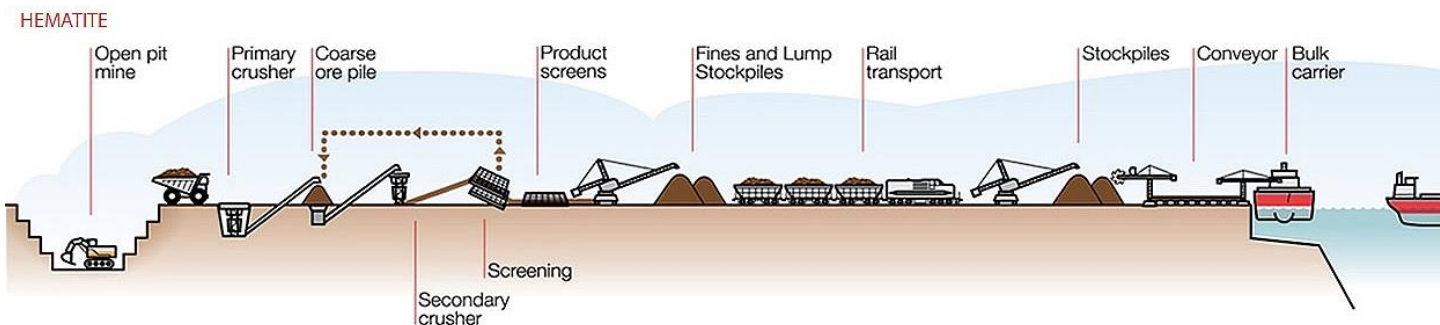


AT ECORA SOLUTIONS WE ARE OBSESSED TO SOLVE YOUR ISSUES WITH BUILD UP MATERIAL

Each of the four integrated components — equipment, consumables, services, and business intelligence — plays a critical role, and their combination delivers exceptional results. By aligning technology, eco-friendly release agent, automated application systems, expertise, and data, we ensure every solution is precisely tailored to each site's needs — driving performance, improving reliability, and achieving extraordinary outcomes.



ECORA SOLUTIONS IMPROVES THE MATERIAL FLOW IN YOUR MINE



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