

# Overburden Removal Process

Cakra Sigma provides comprehensive overburden removal for coal mining, using advanced planning, state-of-the-art equipment, and experienced teams to efficiently and safely expose coal seams. We optimize every phase, from surveying to final dumping, ensuring productivity, cost-effectiveness, and adherence to environmental and safety protocols.

Our methodology, built on decades of expertise and cutting-edge technology, ensures minimal downtime and optimized equipment utilization. Cakra Sigma manages all overburden types, from soft layers to hard rock requiring blasting, while ensuring sustainable land management and preparing sites for future reclamation.

# Strategic Planning & Site Preparation



## Survey & Planning

Detailed topographic and geological surveys analyze overburden, slope stability, and coal seam positioning, forming the project's foundation.



## Land Clearing

Systematic vegetation removal and topsoil stripping prepare pit areas. Topsoil is segregated and stored for future reclamation.

Our critical planning phase uses advanced modeling software to optimize production schedules and hauling plans. We maximize fleet utilization and minimize cycle times, setting realistic production targets.

Environmental stewardship is paramount. We implement erosion control, drainage systems, and systematic topsoil management to meet regulatory requirements and support sustainable practices.

## Key Planning Deliverables

- Geological & overburden maps
- Equipment optimization & allocation
- Production targets by phase
- Environmental & safety protocols

## Survey Accuracy

Our survey teams use GPS-enabled equipment and drone mapping for centimeter-level accuracy in data collection.

**Result:** Precise planning reduces rework and optimizes material movement efficiency.

# Excavation & Material Movement Operations

Cakra Sigma's excavation operations leverage skilled operators and high-capacity equipment for industry-leading productivity. Our modern fleet is precisely matched to project needs, ensuring optimal bucket fill factors and efficient truck loading.

01

## Drilling & Blasting

Controlled fragmentation of hard overburden via precision drilling and calibrated explosives.

02

## Excavation & Loading

High-capacity excavators load fragmented material onto trucks, optimizing bucket-to-truck matching.

03

## Hauling & Dumping

Efficient material transport on engineered haul roads to designated dump sites, with real-time cycle monitoring.

04

## Dozing & Leveling

Bulldozers spread and compact materials, creating stable, engineered dump profiles.

For hard rock layers, we implement controlled drilling and blasting under strict safety protocols. Specialists optimize shot patterns for fragmentation and ground vibration control. Comprehensive safety briefings and environmental monitoring precede every blast.

## Loading Efficiency Metrics

Our teams achieve high bucket fill factors and minimize cycle times through proper digging techniques and optimized truck spotting.

- **95%+** average bucket fill factor
- **45-60 seconds** typical loading cycle per truck
- **98%** equipment availability

## Hauling Optimization

Cakra Sigma designs engineered haul road networks to reduce rolling resistance and maximize payload efficiency, minimizing fuel consumption. Our dispatch systems track truck cycles in real-time, optimizing equipment allocation for continuous loading.

 **Safety Excellence:** All blasting operations adhere to strict safety protocols, including inspections, area clearance, and vibration monitoring. Our perfect safety record reflects our unwavering commitment to operational responsibility.

# Dump Management & Site Maintenance

Effective dump management is crucial for safe, efficient overburden removal. Cakra Sigma engineers stable waste disposal areas, considering long-term stability, drainage, and future reclamation from initial design.

## Dump Area Engineering

Engineered dump profiles ensure long-term stability via geotechnical analysis. Optimized lift heights and slope angles prevent failures and ensure safety.

## Drainage Management

Robust drainage systems prevent water accumulation and erosion. Ditches, cross-drains, and sediment controls protect water quality and maintain stability.

## Access & Safety Systems

Maintained access roads ensure safe equipment movement. Berms, signage, and lighting provide multi-layered safety for personnel and equipment.

Bulldozer operations are crucial for dump management. Skilled operators spread and compact materials, creating uniform lift profiles and stable working platforms. Proper compaction reduces settlement and ensures areas remain safe and functional.

## Maintenance Priorities

1. Haul road maintenance
2. Preventive equipment maintenance
3. Drainage inspection
4. Safety barrier upkeep

## Continuous Monitoring

Cakra Sigma uses comprehensive monitoring for performance and improvement. Teams inspect haul roads, dumps, and equipment to maintain optimal standards.

Real-time equipment monitoring tracks performance, fuel, and maintenance. This data-driven approach maximizes equipment availability and minimizes breakdowns.

"Proper dump management and preventive maintenance are the foundations of sustained productivity. Cakra Sigma's disciplined approach ensures consistent production targets, safety, and environmental standards."

# Performance Excellence & Operational Advantages

Cakra Sigma's overburden removal services deliver measurable value through operational excellence, advanced equipment, and experienced personnel. Our integrated approach ensures superior productivity and cost-effectiveness.

**98%**

## Equipment Availability

Maintained through rigorous preventive maintenance and on-site support.

**15-20%**

## Fuel Savings

Achieved via optimized haul road design and equipment matching.

**Zero**

## Lost-Time Incidents

Ensured by comprehensive safety programs and continuous training.

## Core Competitive Advantages

- Integrated Planning:** Optimize operations through geological analysis and engineering design.
- Modern Fleet:** High-capacity equipment for maximum productivity.
- Experienced Teams:** Skilled operators and supervisors with decades of expertise.
- Safety Culture:** Zero-harm commitment embedded in all procedures.
- Environmental Stewardship:** Sustainable practices protect ecosystems.

## Client Partnership Approach

Cakra Sigma partners with mine management to understand objectives and challenges. This collaborative approach ensures customized services and reliable results.

**Optimize Your Overburden Removal?** Contact Cakra Sigma for customized solutions to enhance productivity, reduce costs, and maintain high safety and environmental standards.