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Total Section Monitoring

INNOVATIVE PRODUCTION TECHNOLOGY
EXPERT CONSULTANCY DRIVEN BY EXCELLENCE IN TECHNOLOGY

EXCELLENCE THROUGH TECHNOLOGY: TURNING SECTION DATA INTO PRODUCTION GAINS

In underground bord-and-pillar mining, production performance is rarely lost through one dramatic failure. Instead, it erodes quietly through under-utilised equipment, delayed support activities, and decisions made without timely, reliable data. While continuous miners have long been monitored for uptime and downtime, the broader section has traditionally remained a blind spot, leaving line management to manage complexity with partial visibility.

It is precisely this gap that **MCS's Total Section Monitoring,"TSM"**, technology was designed to address.

The Challenge: Managing What You Can't Fully See

In a typical bord-and-pillar section, production output is highly sensitive to the availability and utilisation of supporting equipment, particularly shuttle cars and roof bolters.

Mining studies consistently show that:

- The loss of one shuttle car can reduce production by approximately 20%
- The loss of two shuttle cars can result in production losses of around 50%

Roof bolter downtime carries a compounding effect, as legislation permits no more than two unsupported faces at any time, making bolter availability a critical KPI.

Despite the importance of these machines, real-time, integrated visibility of their performance has historically been limited. Information often arrives too late, in fragmented formats, or without sufficient context to enable immediate corrective action.

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THE SOLUTION: TOTAL SECTION MONITORING IN ACTION

MCS recently implemented it's **Total Section Monitoring,"TSM"** system at Seriti Resources' New Denmark Colliery, in partnership with Dimako Industries, marking a significant step forward in section-level performance management. Building on existing continuous miner uptime and tablet-based downtime monitoring, **TSM** introduces an additional layer of intelligence by capturing real-time operational data from the entire section.

The system comprises of:

- Hardware retrofitted to the Dimako Power Centre, monitoring the drives of:
    - Three shuttle cars,
    - The roof bolter,
    - The feeder breaker,

- Real-time data transmission to surface via the existing mine network,

- Seamless integration with long-standing MCS continuous miner datasets through the MCS Control Panel.

Because the hardware is static within the Power Centre, the system is easier to manage than traditional bolt-on solutions. The only human intervention required is reconnecting to the network after a section conveyor extension. Importantly, the hardware includes onboard data storage, ensuring no data loss during network outages — information is automatically uploaded once connectivity is restored.

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FROM DATA TO DECISIONS: REAL-TIME VISIBILITY FOR LINE MANAGEMENT

TSM processes combined section data every 15 minutes, feeding an almost real-time, web-based dashboard accessible to all line management on the site network at the click of a button.

While security restrictions currently limit off-site access, the system architecture allows for remote viewing should permissions be granted in future.

In addition to live dashboards, the data is automatically compiled into end-of-shift reports, emailed to relevant line management to provide a comprehensive overview of section activities, performance trends, and bottlenecks.

TOTAL SHIFT LOADS	19	TOTAL SHIFT TONNES	171				
Feeder Breaker		**Bolter/s**		**Shuttle Car/s**			
Shift Start: 11 Dec 2025 07:00 Shift End: 11 Dec 2025 16:30 Day Shift	UFB025 Feeder Breaker	Shift Start: 11 Dec 2025 07:00 Shift End: 11 Dec 2025 16:30 Day Shift	URBF06 Bolter	Shift Start: 11 Dec 2025 07:00 Shift End: 11 Dec 2025 16:30 Day Shift	USC059 Shuttle Car 11	USC069 Shuttle Car 12	USC085 Shuttle Car 3
Equipment Active	🟢	Equipment Active	🟢	Equipment Active	🟢	🟢	🟢
Last Activity Data	Dec 11 2025 3:50PM	Last Activity Data	Dec 11 2025 3:23PM	Last Activity Data	Dec 11 2025 2:45PM	Dec 11 2025 2:39PM	Dec 11 2025 2:34PM
Face Time (Min Target)	365	Face Time (Min Target)	365	Face Time (Min Target)	365	365	365
FB ON (Min)	418	RB ON (Min)	362	SC ON (Min)	357	356	352
Availability	114.52 %	Availability	99.18 %	Availability	97.81 %	97.53 %	96.44 %
Utilization	50.96 %	Utilization	26.85 %	Utilization	3.84 %	22.74 %	9.32 %
First Active Use	Dec 11 2025 8:52AM	First Active Use	Dec 11 2025 9:21AM	Total Cycle (Min)	14	83	34
Number Of Cars Discharged	19	Last Active Use	Dec 11 2025 3:23PM	First Active Use	Dec 11 2025 8:48AM	Dec 11 2025 8:43AM	Dec 11 2025 8:42AM
Tonnes	171			First Load	Dec 11 2025 2:40PM	Dec 11 2025 8:48AM	Dec 11 2025 9:17AM
Last Active Use	Dec 11 2025 3:50PM			Number Of Loads	3	12	4
				Load Avg Time (Sec)	61	57	55
				Last Load	Dec 11 2025 2:45PM	Dec 11 2025 2:39PM	Dec 11 2025 2:34PM
				Shuttle Car Cycles	3	12	4
				Shuttle Car Size	9	9	9
				Tonnes	27	108	36
				Last Active Use	Dec 11 2025 2:45PM	Dec 11 2025 2:39PM	Dec 11 2025 2:34PM

Shift activity log

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BEHAVIOUR CHANGE BACKED BY EVIDENCE

At the time of installation, analysis revealed that shuttle car usage in the monitored section typically ranged between one and two cars per shift — well below optimal utilisation.

By combining **TSM data** with background information from the MCS Mobile App, integrated into the mine's Management Operating System,"MOS", the root cause was quickly identified: a labour shortage, rather than mechanical availability.

Once addressed, behaviour shifted decisively. The consistent use of three shuttle cars per shift became the norm, resulting in a marked increase in production rates and tonnes produced.

A similar improvement was observed in roof bolter-related downtime. In the three months following installation, the section stood for roof bolting only once, compared to multiple occurrences in the preceding three months. Given that each waiting-for-support event typically results in 45 to 60 minutes of lost production per face, the operational value of this improvement is substantial.

		Dec 2025	Dec 2025	Dec 2025	Dec 2025	Dec 2025	Dec 2025	Dec 2025
		Mon	Tue	Wed	Thu	Fri	Sat	Sun
		01	02	03	04	05	06	07
Team: A								
BP	Shabalala	Yes	Yes	Yes	Yes	Yes		
CW	Ferreira	Yes	Yes	Yes	Yes	Yes		
DM	Nhlapho	Yes	Yes	Yes	Yes	Yes		
ET	Mzamo	Yes	Yes	Yes	Yes	Yes		
J	Mbele	Yes	Yes	Yes	Yes	Yes		
JM	Mnisi	Yes	Yes	Yes	Yes	Yes		
L	Sithole	No	No	No	No	No		
Lungisa	Mtengwane	No	No	No	No	No		
SA	Mkhize	Yes	Yes	Yes	Yes	Yes		
SJ	Dhlamini	No	No	No	No	No		
V	Sillo	Yes	Yes	Yes	Yes	Yes		
ZS	Tsotetsi	Yes	Yes	Yes	Yes	Yes		

MEASURABLE IMPACT, SUSTAINABLE IMPROVEMENT

While the production gains cannot be attributed to technology alone — line management ultimately drove the behaviour change — the availability of timely, trusted data was the catalyst.

Based on a **three-month sample period**, the combined improvements across shuttle car utilisation and roof bolter availability translate to an annualised **production increase of approximately 20,000 tonnes per annum.**

			PTO Min	PTO Eng	HPH	Checks	SS	M	Est M	TONS	DOH	JDO H	MJDO H	FS	LS	SC HR	LAB Min	LAB Eng	CH4 Trips	Eng Comp – Plan	Var	Comments
Mmabatho	UCM 50	Target	6	3	3	18	3	99	99	1974	11.3	11.3	8.8	3	3	63	30	6				
		Actual	26	3	4	21	3	62	84	1202	10.2	6.8	9.1	2	2	53.25	25.0	6	0		109	
Shosholoza	UCMO 40	Target	6	3	3	18	3	99	99	2085	11.3	11.3	8.8	3	3	63	30	6				
		Actual	7	4	4	18	3	108	83	2211	13.2	10.3	10.5	2	3	56.00	30.0	6	0		59	
Simunye	UCM 48	Target	6	3	3	18	3	84	84	1893	8.8	8.8	9.6	3	3	63	30	6				
		Actual	7	4	4	19	3	56	49	1261	7.3	6.0	9.3	2	2	53.50	26.0	6	0		37	
Siyanqoba	UCMO 52	Target	6	3	3	18	3	90	90	1944	8.8	8.8	10.3	3	3	63	30	6				
		Actual	8	3	3	18	3	48	49	1034	9.4	6.3	7.6	2	2	48.00	24.0	5	0		225	
Sinethemba	UCMO 42	Target	6	3	3	18	3	90	90	2334	8.8	8.8	10.3	3	3	63	30	6				
		Actual	6	6	3	20	3	52	48	1346	7.0	6.3	8.3	0	1	21.83	24.0	6	0		99	
Naledi	UCMO 43	Target	6	3	3	18	3	84	84	2265	8.8	8.8	9.6	3	3	63	30	6				
		Actual	6	5	3	21	3	62	0	1671	11.5	0.0	#Error	0	0	52.25	22.0	7	0		675	
Central Shaft Target			36	18	18	108	18	546	546	12495	57.6	57.6	9.5	18	18	378	180	36				
Central Shaft Total			60	25	21	117	18	388	313	8725	58.6	35.7	10.9	8	10	284.83	151.0	36	0		1204	

Central #,Shaft Review L4 - REPORT — Site Name: — NDC — Date Selected: 04 Dec 2025

What's Next: Expanding the Intelligence Layer

The next phase of **TSM** development will introduce a second dashboard page, incorporating additional contributory factors to production losses. Targets will be derived from the **MCS Shift Planning Tool**, while actuals will be sourced from continuous miner data and mobile app modules — providing an even richer, end-to-end view of section performance.

Although developed collaboratively with Dimako Industries, the TSM methodology has also been successfully evaluated across other switchgear suppliers.

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CONTINUOUS IMPROVEMENT THROUGH TECHNOLOGY

The implementation at Seriti New Denmark Colliery demonstrates how integrated, real-time section data can unlock meaningful production improvements — not through complexity, but through clarity.

As MCS continues to develop solutions that deliver actionable mine-related intelligence, the focus remains unchanged: **enhancing safe production through continuous improvement, driven by technology** that enables better decisions, faster responses, and sustainable operational excellence.

Watch this space for further innovations from MCS as we continue to redefine what is possible in **data-driven mining.**

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PROUDLY TAKING THE STAGE: MCS AT THE COALTECH AGM & IDEATION CONFERENCE

Alongside these, MCS showcased a suite of technologies that underscore its commitment to **safety and efficiency:**

- **LED lighting and BLE lifelines** designed to improve underground safety conditions.

- **Next-generation gas monitoring** for a proactive approach to hazard detection.

- **BLE aggregators for vehicle tracking and oil monitoring**, delivering the insights needed to keep machinery running longer, safer, and more reliably.

Shaping the Future of Mining

Each of these innovations reflects MCS' growing role in the mining sector, not as a follower, but as a **technology partner of choice** for forward-thinking mining houses. The industry stands at a turning point, where digital transformation, data intelligence, and sustainability are becoming non-negotiable. MCS is committed to being part of that evolution, helping mines to embrace a future where technology drives both **profitability and safety.**

As a proud member of Coaltech, MCS continues to invest in partnerships and platforms that support the sector's growth. We extend our sincere thanks to **Avhurengwi and Carmen** for curating a superb event that continues to fuel collaboration and innovation across the industry.

The journey of MCS in mining has only just begun, but our vision is clear: to **redefine operational excellence through technology**, setting new benchmarks for what is possible underground and above.

The future of coal mining will be defined by those who dare to innovate. MCS is ready to lead that charge.

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