

Introduction to MatchPRO

For determining the cutpoint for multiple circuits and aligning DMC modules for optimal performance

- Determination of multiple DMC cutpoint in a single test
- Low-cost application using 66% less tracers than CurvePRO
- Rapid testing with efficient results in less than an hour
- Requires a single operator and no external contractors
- Hazard-free on-site testing with no off-site sampling



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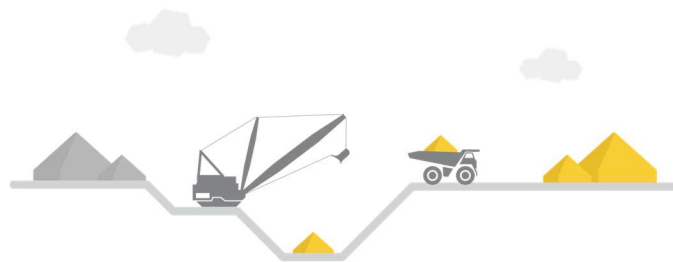
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Overview

Australian coking coal DMS plants waste around half a billion dollars worth of product per year due to inefficient partition curves. These are caused by poor Epm from individual separators and bypass or mis-alignment of cut points in parallel circuits.

Using RFID tracers and CurvePRO hardware, Partition Enterprises has developed a simple low-cost procedure to determine the cut point for multiple circuits and align modules for optimal performance..



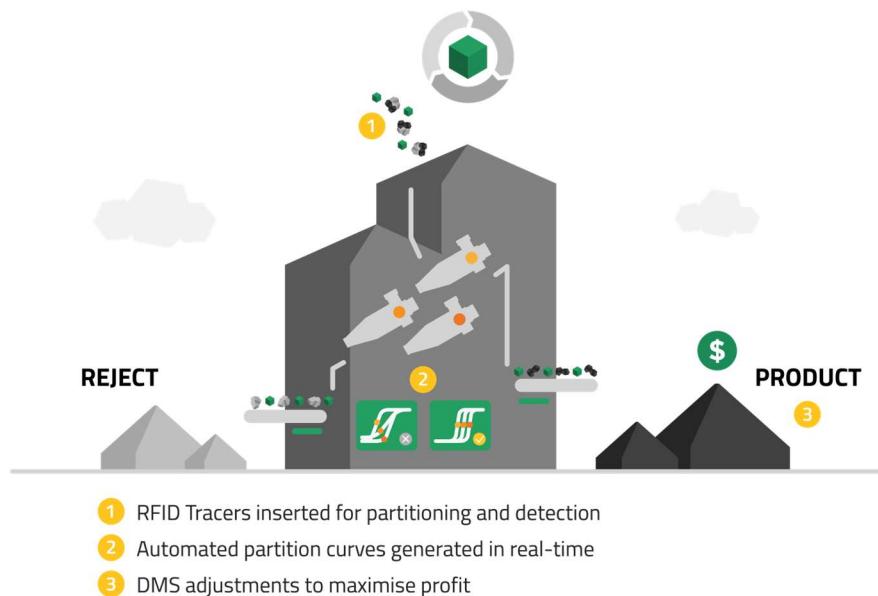
What is MatchPRO

MatchPRO is an additional feature to Partition Enterprises CurvePRO RFID tracer system for monitoring and optimising DMC operation.

It allows a single operator, at low cost, to rapidly determine the cut point of all DMC modules in a single test using only one third of the tracers used in a regular CurvePRO audit. Results from a MatchPRO test will be used to equalise parallel module cut points, thereby increasing plant-wide DMC yield.

The time efficiency and ease of use of MatchPRO is due to:

- Determination of all DMC cut points in a single test
- Only 1/3 of tracers used compared to a OR uses 60% less tracers than a CurvePRO audit
- RFID tracers are custom coded for individual DMC modules
- Custom software notifies operator of required tracer densities



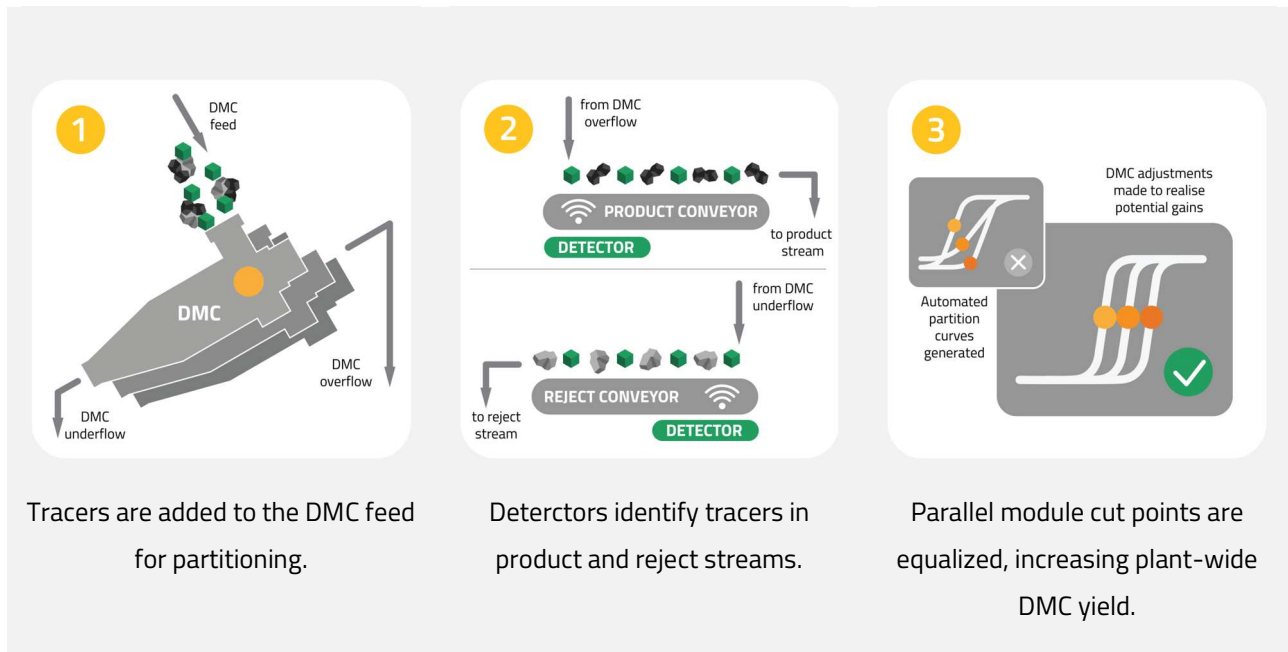
Note: A MatchPRO upgrade can only occur where there is an existing CurvePRO system and contract in place.

Determine the individual cut points of up to 8 DMCs
by a single operator in less than 1 hour.

How MatchPRO Works

MatchPRO will simultaneously determine the individual cut points of up to 8 DMCs by a single operator in less than one hour.

Results from a MatchPRO test will be used to determine new medium density set point modifiers for each DMC module, thereby minimizing the cut point spread between modules and increasing plant-wide DMC yield.



If the data is to be obtained directly from the MatchPRO system, through SCADA, then Partition Enterprises can work with your IT department to achieve this.

MatchPRO only uses 10 tracers per required density. Mathematical simulations have shown that 10 tracers per density is sufficient for determination of cut point, but is insufficient for determination of Epm. To determine both cut point and Epm, a CurvePRO audit using 30 tracers at each required density must be carried out.

For statistical confidence in calculated cut point for each module, MatchPRO density tracer selection requires:

- 10 tracers inserted per density
- At least 9 consecutive densities from Partition Enterprises' list of standard RFID traces
- Partition numbers of 50% or greater for at least two of the densities used
- Partition numbers of 50% or less for at least two of the densities used

MatchPRO Hardware



MatchPRO RFID density tracers.



Detector installed under product conveyor.



MatchPRO Control Centre.

Minimise the cut point spread between modules
and increase plant-wide DMC yield.



Advantages of MatchPRO

MatchPRO will simultaneously determine the individual cut points of up to 8 DMCs by a single operator in less than one hour.

MatchPRO enables determination of DMC cut points to be a low-cost, simple, rapid, sampling-free process for an operator on site. These features ensure that the project has a high chance of long-term success.

At the completion of a test, MatchPRO will calculate the new recommended medium density set point modifiers for each DMC module, which should be input into the site SCADA system.

Yield gain will be immediate and there will be no delays in needing to refer to the mining group or contractor experts for analysis and recommendations.

- ✓ Determination of multiple DMC cut points in a single test
- ✓ Low-cost application using 66% less tracers than a CurvePRO audit
- ✓ Rapid testing with efficient results in less than one hour
- ✓ Requires only a single operator with no external contractors
- ✓ Hazard-free on site testing with no off-site sampling required



The MatchPRO user interface and MatchPRO website can be seen in the Dropbox video and screenshots shown below.

<https://www.dropbox.com/s/s7io8b4wi3e6hi6/MatchPRO%20Simulation.mp4?dl=0>

1. Control Centre screenshot of MatchPRO test advising operator to insert additional densities to ensure confidence in calculated module cut points

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3. Screenshot of MatchPRO website displaying test results and cells for entry of test conditions

CurvePRO Connect

Super User
Admin Console

Dashboard

Audits

Sites

Manage Users

Audit

Density Tracer Data

Module	1	2	3	4	5	6	7	8						
RD	F	S	F	S	F	S	F	S	F	S	F	S	F	S
1.43						8	2							
1.44						7	3							
1.45						7	3							
1.46	8	2	9	1	10	0	6	4						
1.47	7	3	9	1	10	0	5	5						
1.48	6	4	8	2	10	0	5	5						
1.49	5	5	8	2	10	0	4	6						
1.50	4	6	7	3	10	0	4	6						
1.51	3	7	7	3	9	1	4	6						
1.52	2	8	6	4	8	2	3	7						
1.53	2	8	5	5	7	3	3	7						
1.54	1	9	5	5	6	4	2	8						
1.55			4	6	5	5								
1.56			4	6	4	6								
1.57			3	7	3	7								
1.58					2	8								
1.59					2	8								
1.60					1	9								

AUDIT CUT POINTS

d ₅₀	1.490	1.460	1.487	1.481										
Spread of d ₅₀	0.030													
Excellent	Good		Poor		Very Poor									
0.000 - 0.015	0.015 - 0.025		0.025 - 0.050		0.050 +									

To increase likelihood of an excellent yield, increase the frequency of MatchPRO auditing and consequent changes to module cut point modifiers.

Master RD and Modifiers

Master and Modifiers during this audit

Master RD	1.35
Module	1
Modifiers	0
Modified Set Points	-
Recommended New Modifiers	-

Audit Conditions

The audit has been verified by Partition Enterprises.

Audit Details

Quick Reference:

North plant, seam XY, 8D pressure

Audit ID:

Demo Plant__2021_10_30_11_18

4. Screenshot of MatchPRO website displaying data entry checking and approval of recommendations

CurvePRO Connect


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 Modifier Checking

Correct testing, calculation and implementation of modifiers can increase mine revenue. Errors in testing, calculation and implementation can result in lost revenue.

Data Entry

Audit conducted by:

Master density set point and all modifier
RD and Modifiers) entered by:

First 90 tracers for each Module inserted in the following module
order:

Tracers inserted by:

Entry Checking and Approval of Recommendations

To be completed by an experienced engineer who was not responsible for sourcing of Master and Modifier data.
Employing the approximation that a change in medium density causes an equal change in d50,

Equation 1

Values of modifiers and modified set points are not normally displayed on control room monitors.
It should appear that all modules are set to the same medium density set point.

Since the audit I have:

☒ 1. **Independently** accessed SCADA records and checked the Master and Modifier entries.

☒ 2. Reviewed trend data for disruptions to feed, medium RD or DMC inlet head.

☒ 3. Used Equation 1 to check the values of the recommended New Modifiers.

Audit approved or rejected?

☒ **Approved**

☐ **Rejected**

If rejected, reason:

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MatchPRO Recommended Testing Frequency

It is recommended that a MatchPRO test is conducted every week for the first month. Depending on the results from the first month the frequency of testing may be increased or decreased.

MatchPRO Inclusions

Included in MatchPRO will be

- New Control Centre 300Hx400Wx250D stainless enclosure (to replace existing Control Centre)
- Larger 10-inch screen to accommodate more detailed user interface
- Tracer carry-case for each module
- CurvePRO Mainboard (to replace all electronics on existing Control Centre backplate)
 - consolidates all parts from previous version
 - no. connections and failure points minimized
 - vibration resilient
 - 4G hardware, modem, and antenna
 - less troubleshooting with quick swap out/in of Mainboard
- MatchPRO Software and Website
 - user interface simple and easy to navigate
 - rapid determination of module cut points
 - density tracer requirement alerts
- Option to send data to Partition Enterprises website for site personnel to
 - input test conditions
 - sign off
 - generate printable test results sheet
- Partition Enterprises support and equipment maintenance as detailed in current CurvePRO agreement
- On-site supervision of installation, training, and conduct of first few audits by Partition Enterprises engineer or technician.

Note: A MatchPRO upgrade can only occur where there is an existing CurvePRO system and contract in place.

MatchPRO Installation Requirements

Installation of the new Control Centre and re-termination of the 24V power and communications cable is estimated to take 1 electrician or fitter 3 – 4 hours, depending on whether there is a need to add additional uni-strut.

The existing Control Centre is 400H x 300W x 250D. The new Control Centre is 300H x 400W x 250D.

MatchPRO Tracer Selection

A MatchPRO manual will be provided. Within the manual will be a tracer picklist which the operator will use to identify the first 3 tracer boxes (9 densities) required per module. During the test, MatchPRO will alert the operator if any additional tracer densities are required.

Cost of MatchPRO RFID Tracers

MatchPRO tracers, with current pricing, can be purchased from www.partitionenterprises.com.au (*under construction*). Each tracer has a unique ID which references its density and has a module number designation. Additional stringent quality control checks will be added. Tracer boxes labelled with included densities and module number.

Box of 30 x MatchPRO tracers (10 tracers at each of 3 densities)

\$280 + GST

Cost of MatchPRO

Additional annual lease cost of MatchPRO equipment and software.

Please contact us with your individual requirements.

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