Mining & Innovation

‘Process Understanding Before Technical Wizardry’
Why Do We Keep Building New ‘Old’ Mines?

We tend to make things bigger, faster, and more automated...

...but we rarely change the underlying processes.
Do Our Engineers Think In Terms Of Integrated Processes?

Evidence suggests an innovation focus on single processes...

- Mining is a linear series of integrated production processes that transform, transport, or store, the product.
- Production processes are also integrated with service processes such as ventilation, water supply, pumping, supplies handling, etc.
- All of the above are integrated with social processes with all of the complexity that personal fears and motivations bring to the innovation equation.
- Innovation tends to fail to meet expectations unless the impact on all associated processes is understood and accounted for.

...without an overall assessment of the full suite of processes
Where To Find The Horsepower & Wisdom That Can Work Through The Complexity Of The Integrated Processes?

Senior executives are the most likely source, but they are...

- Perhaps some innovative thinking is required as to how senior executives can best spend their time to add the most value to the organization? Useful adages:

- An organization can only sustain as much change as the cross-over manager personally leads. (Not sponsors, leads)

- Executives cannot add much value by dealing with today’s details, but they can contribute a great deal by finessing the details that will affect the future of the business.
  
  - How the processes, in future mines, integrate to optimize the whole is a ‘detail’ that can enhanced by executive horsepower, experience, and wisdom

...generally far too busy in meetings to contribute at this level
How Can We Help Make Efficient Use Of Executive Time?

Map and measure the technical processes, understand the...

- Transformation processes, transform the product from one state to another. (Drill and blast, crushing, etc.) Need to understand the Quantity and Quality of the process and the underlying theory as to how it transforms.

- Transfer processes move the product from one place to another and should not transform the product.

- Storage processes are generally not optimal but are justified if process variability is high.

- Understanding the process bottleneck is the key to focussing innovation and it should be the most expensive capital asset.

...purpose of each process step, variability, and bottlenecks
Focus Innovation On The Bottleneck To Increase Production

Understand the bottleneck and the gap to the next one...

- The bottleneck should be the most expensive capital asset in the series of processes.
- Non bottleneck processes are great places to save costs, but generally not a productive place to try and increase throughput.
- The exception to that rule is when a specification in a non-bottleneck process is controlling the throughput levels of the bottleneck.
- Mines and processing plants frequently have more opinions than measurement as to what their bottleneck is and the gap to the next one.

...change, before, or after the bottleneck may be the solution
Unfocussed Innovation Has ‘Burned’ Many A Manager

Innovators in non-bottleneck processes have failed to deliver...

- Innovators need to convince gun shy managers that ‘this time’ they are right.
- The best chance of success in such a sales effort is to demonstrate the spare capacity in each process and illustrate the gap that can be closed to the ‘next’ bottleneck, the amount of capital it will take to close that gap, and the associated financial rewards.
- Managers tend to be afraid of unintended consequences of an innovation and need to know that the risks have been well considered, including the social ones, and that there is an ‘escape hatch’ if the innovation fails.

...on their promises, and many managers are now gun shy.
Technical Innovators Frequently Under Estimate Social Risks

Non-engaged employees can easily kill an innovation...

▷ To engage, employees need to know positive answers for three questions:

1. What do you want me to do?
2. How am I doing?
3. What is my future?

▷ An inability to answer that third question, positively, and with confidence, is the missing link in many technically brilliant innovations

...they need to understand their ‘post innovation’ future
The ‘Escape Hatch’ Is also Critical

Underground mines are a linear series of processes that are...

» In a billion dollar mine, the most expensive process might be $50M, but if it doesn’t work, the whole billion is useless

» That sort of risk is not for the faint of heart and even the brave can be much braver if there is a rapid escape to ‘conventional’ if the innovation doesn’t work

» The best solution might be to have an escape hatch, have the CEO owning the innovation, and have a CEO that is close to retirement...

...carved out of solid rock. Re-excavating is career suicide
I took grief for years for designing RopeCon into our process. Now that it ramped up so easily, we have earned the right to be ‘first’ in the future, even though they worry.

Our next mine is coming off the drawing board and it includes a full process review and is seriously innovative. (This is far too short a presentation to talk about it)

...but they prefer that ‘their’ companies race to be second
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