

# Change Management Strategies in Extractive Industries — Analysis, Design and Implementation for Brownfield and Greenfield Sites

M Minns<sup>1</sup> and M McLean<sup>2</sup>

## ABSTRACT

This paper deals with change strategies on brownfield and greenfield sites in extractive industries. It draws upon contemporary experiences across Australian, Indonesia and Papua New Guinea (PNG).

Change strategies can be used when owners of an extractive industry operation want to optimise their resource. This paper draws upon many tried and proven theories and practices, including the findings of the Tavistock Institute (Trist, Emmerly, Bamford, Jaques), as well as the concepts of Adult Learning espoused by Malcolm Knowles and is supported by learnings of Australian based management consultants.

This paper reviews a range of approaches that have succeeded in the integration of systems, machines and people, with the key corporate objectives of: increasing productivity; decreasing cost; improving on-time delivery performance and achieving long-term survival. Such integration needs to be measured to show the outcomes from the change strategies and the authors have worked within many measurement regimes and metrics but for the most part, found that Jaques' set of metrics being 'quality, quantity, resources and time' has gained currency across many Australian operations.

This paper contends that investing money in machines alone without a commensurate investment into the people side is counter-productive. Further, if there is not an understanding of processes, ie stable and capable, core and support processes, then all that new technologies will do, is to make what is done badly, only quicker. Recent interventions for the most part, have been cognisant of this balanced approach towards change management.

The change strategies described are across extractive industry implementations, using a number of tools and techniques drawn from Continuous Improvement and Six Sigma™ (registered trade and service mark of Motorola Corporation, USA).

## BACKGROUND

The optimisation of plant, equipment, people and resources can only be as good as the current manager's knowledge and willingness to use these concepts outlined. The lessons learned from over 20 years' consulting to mining and extractive industries, are that the senior manager and the management team must be active participants and thus committed to the processes as described. Not just support, but commitment.

The organisation interventions and the supporting approaches, methods, tools and techniques are extracts from these change strategies implementations. Not all techniques were used as per 'the textbook' so to speak but these were adapted and then adopted to suit clients and their many stakeholders.

There are lessons learned too from regulatory and government bodies using the change strategies and for the most part (Hurst and McLean, 2006), were designed and implemented in difficult and sometimes public forums and strategic arenas.

A socio technical system identifies that within every work environment, there are two systems:

1. a technical system that deals with machines, processes, procedures, capabilities, equipment, sequence of work, arrangements of work; and
2. a social system that deals with individuals, communications, training, pay and rewards, behavioural style, attitude, relationships, blame or no blame culture, power structures (formal and informal).

What the socio technical system recognises is that the outcome of the business is the interaction of these two systems and to invest in plant and equipment alone is actually counter-productive.

Further, to get the best out of the socio technical system, impediments in the social system need to be eliminated. Unhappy, discontented and unappreciated people have the potential to suboptimise any plant and equipment's performance. Extractive industry and government body implementations demonstrated this outcome constantly.

The Pareto Principle (Figure 1) is worth contemplating in this new WorkChoices Industrial Relations environment, where it has been identified that 80 per cent of organisation's problems are due to the systems, which are designed and maintained by management. In Jaques' terminology, what you accept you approve. As an illustration of this point, following the recent Victorian Government Longford Royal Commission into Gas Refinery Explosion, Hopkins (2006) noted 'the owner of a system (Esso) was the person responsible and accountable to ensure that the overall system was working and achieving its objectives in an efficient manner'.

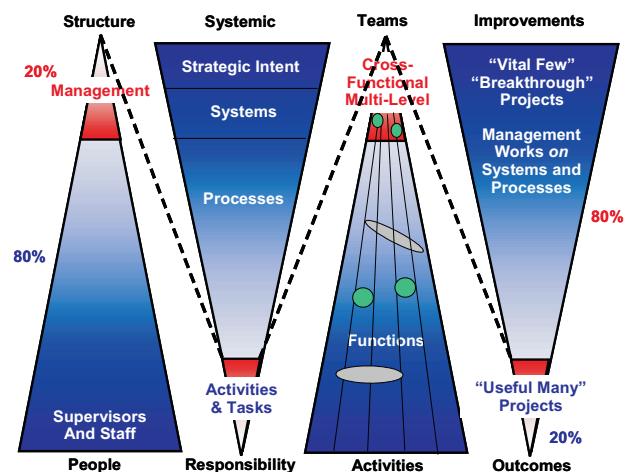


FIG 1 - Pareto Principle '80:20' and pyramid analysis (Hurst and McLean, 2006).

From an individual's point of view in a climate of change, there are three broad steps:

1. paint the big picture; a framework, a frame, depth of field, who else is in the picture, what is the landscape, and what are the dangers and opportunities;

1. Managing Director, Michael Minns Human Resources Pty Ltd, 5 Arlington Avenue, Castle Hill NSW 2154. Email: mmhr@bigpond.net.au

2. Regional Director (Asia), WD Scott, 3 Brookville Road, Toorak Vic 3142. Email: mwmclean@wdscott.com

2. show the individual where they are placed within the picture, ie how they relate to all other aspects captured within the big picture; and
3. take them by the hand and help them to take the first steps to become stable, competent and confident in their behaviour in the big picture.

**Painting the big picture – the plan-on-a-page**

This plan-on-a-page (Figure 2 and Hurst and McLean, 2006) technique has been used in Hunter Valley, PNG, South Coast and Central Queensland open cut, underground, hard rock and soft rock operations along with many other industries and consulting assignments in Europe and Middle East.

It engages the management team in visually describing the strategic intent and aids communication across and within the organisation as a means to engage communities where the mine operates and how other stakeholders or interested parties are, or can be, affected by the operation (Figure 3).

There have been a number of research reports written on why strategy fails (Ohmae, 1982; Campbell and Alexander, 1997), and many have common elements. Beer and Eisenstat (2000) highlight the major points. They conducted research across 12 organisations seeking to understand the reasons why what appeared to be sound strategies were not able to be easily implemented.

The following are six barriers or silent killers (likened by the author to high cholesterol) to strategy (Pearce, 2006):

1. *laissez-faire* senior management style (nine of 12 cases);
2. unclear strategy and conflicting priorities (nine of 12 cases);
3. an ineffective senior management team (nine of 12 cases);
4. poor vertical communication (ten of 12 cases);
5. poor coordination across functions, businesses or borders (nine of 12 cases); and
6. inadequate down the line leadership skills and development (eight of 12 cases).

With this level of success, the change strategies needed strong leadership to drive the sense of urgency and provide new perspectives to building a stable mining operation. Secondly, a more predictive mine management system is required; realistic measures and visual management and importantly, creating the right processes to select the right people to suit the cultural imperatives sought (Ansoff, 1965).

A planning hierarchy (Figure 4) can be designed to ensure that a change strategy has an ongoing reporting and feedback process. To communicate that change, it needs to be designed, measured and reported through and across all levels.

A key to a change strategy is to embed process thinking and

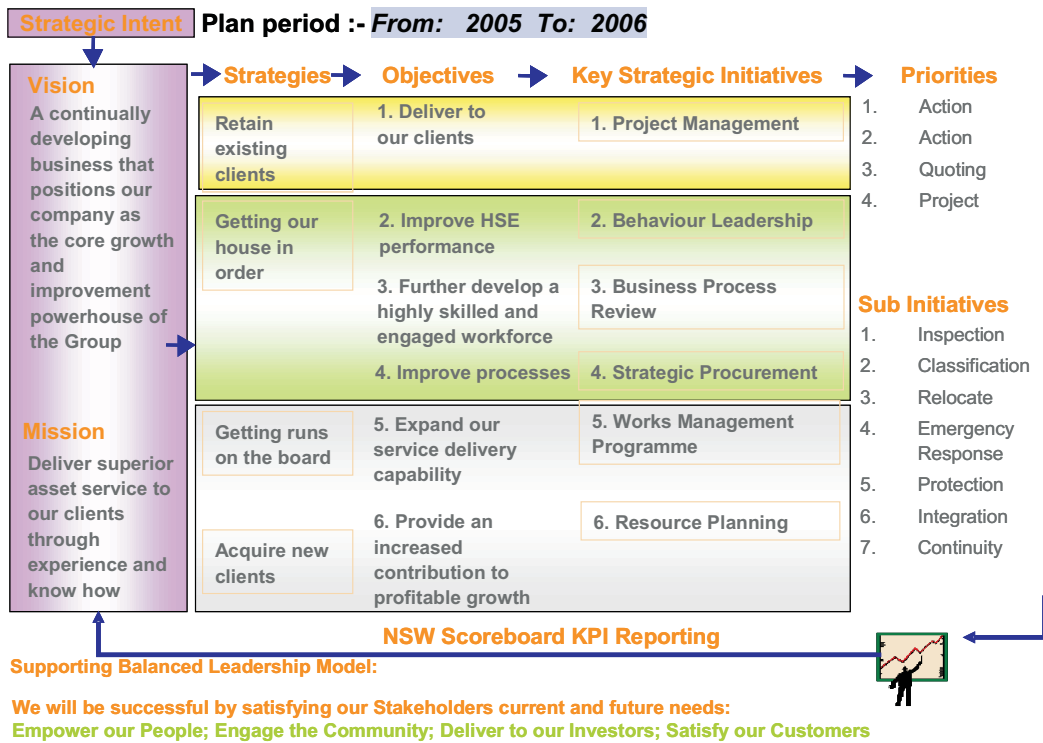


FIG 2 - Plan-on-a-page example.

Each process has a process owner	STAKEHOLDERS			
	Customers	Owner	Employees	Community
Needs of each stakeholder in relation to this process	• • • •	• • • •	• • • •	• • • •
Process targets to meet needs				

FIG 3 - Stakeholder and process alignment.

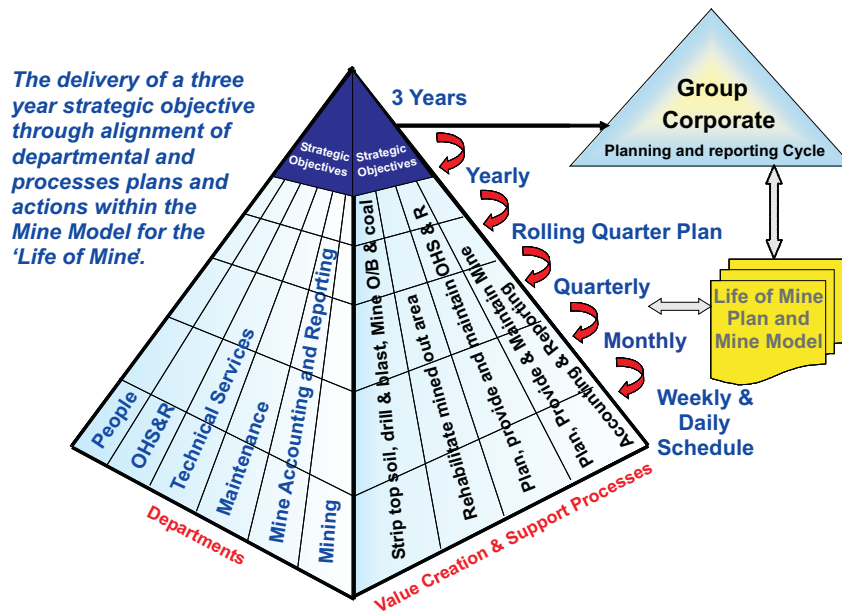


FIG 4 - Planning hierarchy.

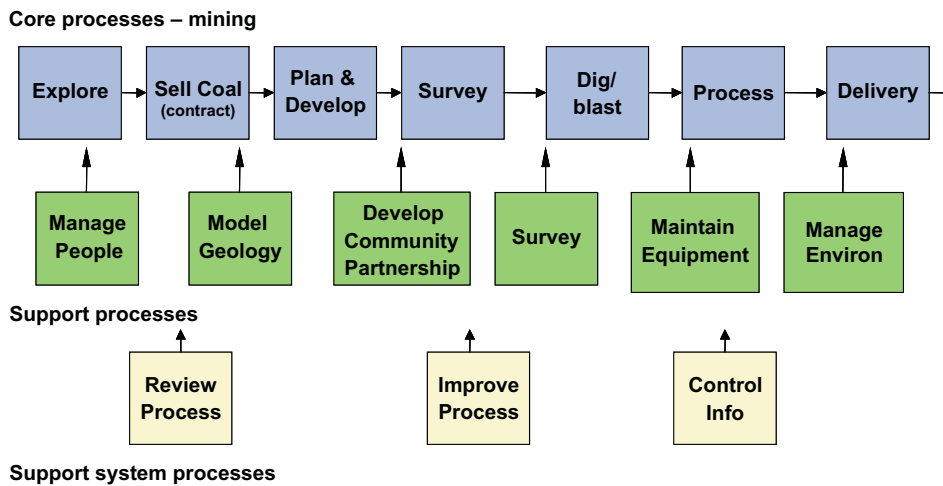


FIG 5 - Mining process or operating model.

management (Hammer and Stanton, 1999) within and across all core and support processes. Hammer and Stanton’s approach is used by many worldwide organisations and reported within the European Foundation for Quality Management (EFQM) in *Above the Clouds* (2006). This European research and Hammer and Stanton’s, describe policies and procedures by ‘verb and noun’, eg ‘design and plan mine model’ and ‘plan, provide, maintain and transition people’ compared to the functional description of ‘stockpile’ or ‘marketing’.

In addition, frequency and forms of reporting sometimes come under scrutiny and can be seen to be ad hoc in nature and lack process-oriented formalisation by way of procedures. These points mean that one needs to develop an organisation’s policy and procedure system around its processes (Figure 5).

This process structure and is not documented as per the headings of any external standards such as WorkCover, Environmental ISO14001 or Quality Management ISO9001 clauses but by the organisation’s processes. An organisation’s Process or Operating Model is the basis to document and meet the various Standards requirements. The ‘identification, interaction and managing of these processes can be referred to as the Process Approach’ (ISO9004:2000).

Two mines in PNG and the Hunter Valley took the approach to draw the ‘big picture’ by the managers. This was done on flipcharts in a variety of media to draw the ‘current and desired culture’. This behaviour engages them visually, in defining the ten key actions they could now ‘see’ what needed action. A different but successful approach for the two mines, as both are still operating (Figure 6).

Given previous experience in designing, setting and communicating mine strategies, a ‘plan-on-a-page’ is seen as valuable and complements the change initiatives that were being considered (Kotter, 1995). It does not always go to plan or as surveyed due to such factors or constraints as fault lines, methane drainage, high wall slips, spontaneous combustion and the increasingly more common these days, excavations over old underground workings (Lewin, 1951).

### Process based organisation and job design

Organisation structures are traditionally functional by design. They reflect passive and in some respects, the environmental operating constraints mines have, meaning that a new basis for operating mines is needed (Figure 7).



FIG 6 - Big picture schematic.

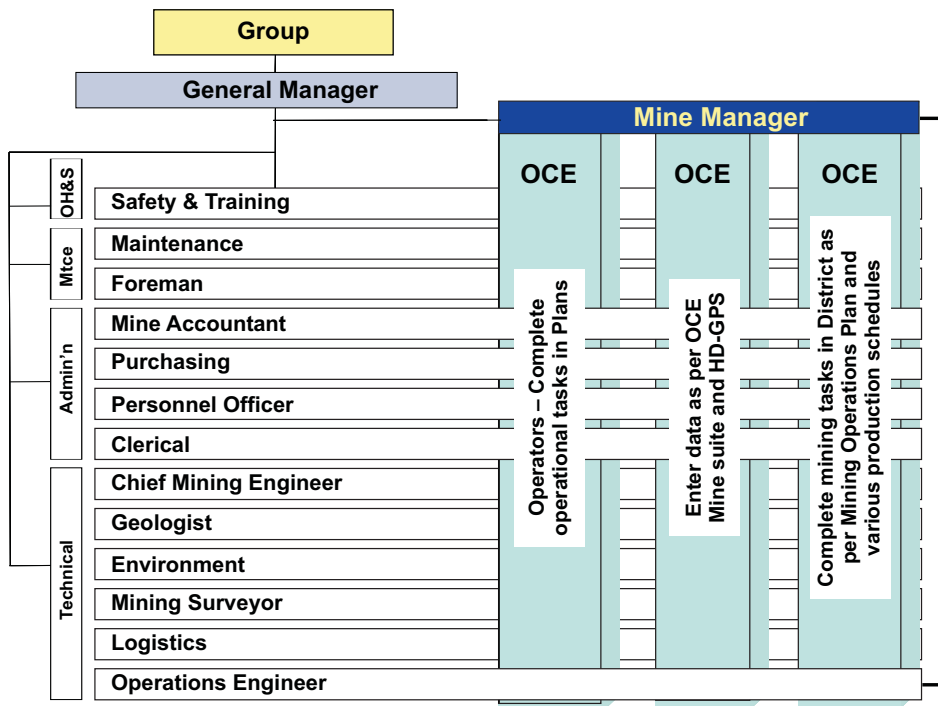


FIG 7 - Process based organisation design.

As previously described, organisation design by process is an approach that reflects planning, managing, improving and resourcing to processes not in standard accounting terms, by function and by allocating costs through labour materials and overheads. Recent use of activity based costing systems is gradually gaining usage and supports the process thinking and strengthens the balanced scorecard perspective of 'process' along with customer, people and financial perspectives (Figure 8).

A process according to many can be summarised by ISO9001:2000 2.4.1 'A set of interrelated or interacting elements or activities which use resources to transform inputs to outputs'. The following is from a coal mine by way of explanation from a production and distribution process:

1. plan production operations,
2. schedule production operations,

3. perform support operations,
4. perform development operations,
5. perform longwall operations,
6. perform conveying operations,
7. measure volume, and
8. monitor production performance.

A review of day-to-day mine operations around this clarity of defined processes, means that other activities such as planning mine capability better meets the needs of the business and other organisations' stakeholders (Liker, 2004). If a change strategy was to have direct impact on people's behaviours, what people do daily in their activities within processes needs better role clarity and standardised performance measures.

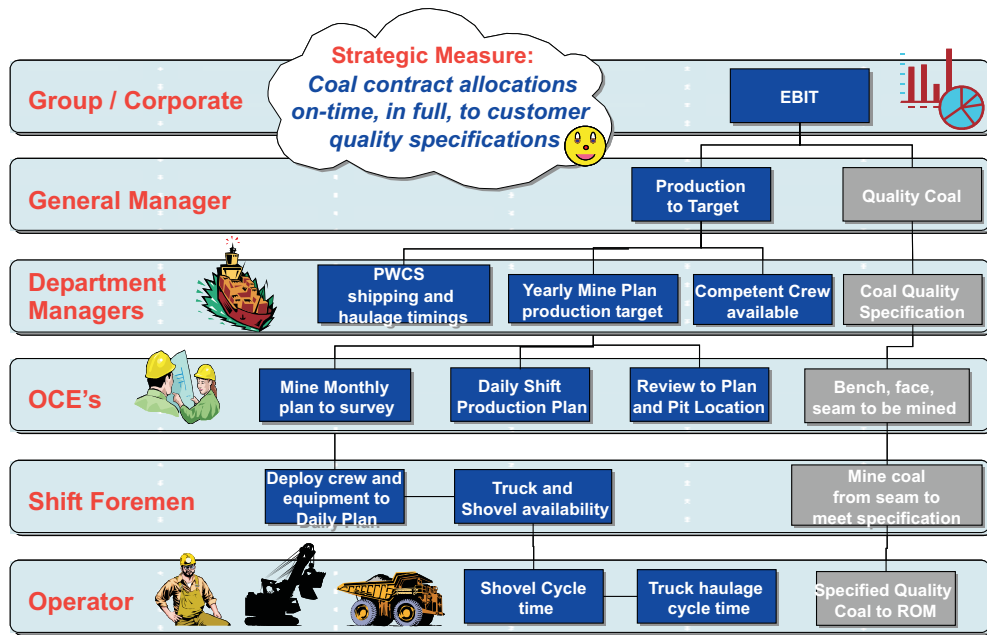


FIG 8 - Deploying measures.

**SELECT THE RIGHT PEOPLE**

**Hire for attitude first not skills**

This hiring process uses the Three-Dimensional Selection System (Minns, 1993) which differs from traditional selection processes on a number of counts:

- allows for multiple hiring by a unique method of ranking using a majority of ordinals,
- peers and direct managers are utilised in the recruitment process, and
- the critical competency dimensions are:
  - attitude and values,
  - skills and/or trainability, and
  - motivation and cultural fit.

Our findings are that attitudes and values are the hardest competency to identify and change, which compared to skills and knowledge, are relatively easier to detect and change (Figure 12).

**Invest in the five-day induction program**

This five-day program goes beyond what is required by the statutes and the unique features are:

- the first person the new employee meets is the mine manager;
- the mine manager explains the meaning and purpose of the organisation and what they expect of employees; and
- other systems, ie training, communications, corrective actions, safety and risk management systems, environmental aspects and impacts are handled by respective department heads.

Our findings are that induction programs are an underrated aspect of managing the people process. Right from day one, new starters need to know what the power structures are within their new organisation. Mines that use these methods have a higher retention rate than those that do not.

A flow chart for recruitment is appended and incorporated within a safe operating procedure and process based management system (Figure 9).

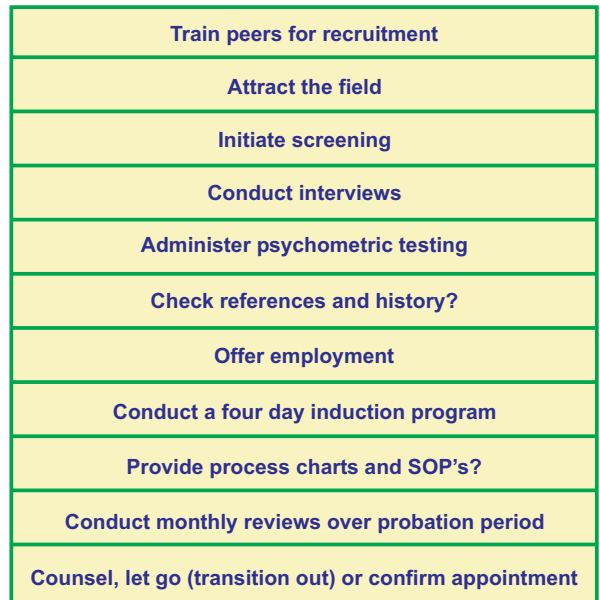


FIG 9 - Recruit people process example (Note: a four-day induction used).

**USE OF PSYCHOMETRIC TESTS**

Our experience is that the best instrument is the ‘Test Attentional and Interpersonal Style’ TAIS® (Nideffer, 1990) as it is able to predict behaviour of an individual when under pressure. The new team members are expected to support the new behaviours and the TAIS® is the only behavioural based test available.

The following is a direct description from TAIS®:

*Psychologist Bob Nideffer observed that the quality of attention mattered most in the performance of athletes. The more he studied attention, it became apparent that attention has several channels and the capacity to appropriately use the right channel at the right time, makes the difference (Figure 10).*

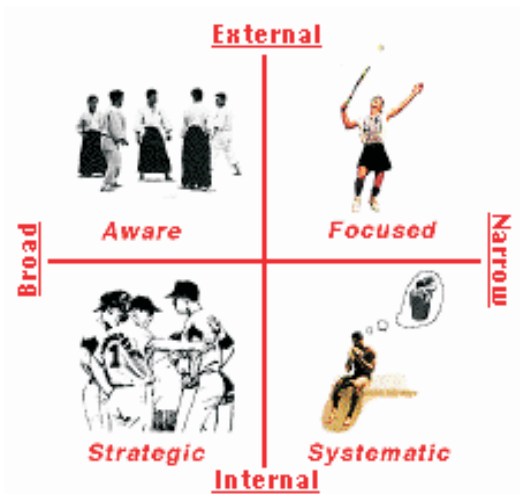


FIG 10 - B Nideffer TAIS®.

Nideffer explored attention in terms of external/internal and broad/narrow. He found that external scanning is quite different from external focus. As his work continued, he found the role of various interpersonal qualities such as expressiveness of ideas or anger influenced attentional qualities. Further he discovered the role of distractions in limiting performance. It is based on over 25 years of research and examines the relationship between attentional processes, physiological arousal and performance. Put more simply it predicts behaviour of an individual under pressure.

Nideffer TAIS® sample report extract follows:

The results show how an individual compares to a 'standard' population in terms of percentiles and a specific norm group (the grey bar). The recipient of the TAIS® report and profile knows what specific areas to address to aid development and enhance performance (Figure 11).

As can be seen, it is a valuable aid to guiding people in coaching and leadership development.

In summary, Nideffer explains further that TAIS®:

*will allow individuals to identify, and how to correct or minimise, the damage caused by confusion, poor focus, concentration skills, situational depression, choking under pressure, authority conflicts, peer conflicts, lack of discipline and lack of authority.*

This is important given, new GPS, plant monitoring and communication systems mean a level of technology that would make for greater operational efficiencies. Where people would be expected to be more numerate, be comfortable in measurement and reporting performance regularly plus be both motivated to self-improve and work in a team-based culture using facts and data to make decisions.

Data-based problem-solving in work improvement teams is a common expectation for all personnel (McLean and Sadek, 2001) using the ISO9001:2000 'plan, do, check and act' cycle or the more common 'plan, do, study and act' cycle. Some mines use the defect problem-solving method of Motorola of Six Sigma™ being 'define, measure, analyse, improve and control'. These 'cycles' are common in continuous improvement and operational excellence programs.

The TAIS® instrument can also be used as the basis of a team-building process for senior management and department teams. It is about understanding the individual differences between team members and learning to accept and respect those differences. Mining operations are different these days and involve daily reporting, visual management, cross-functional work team improvement projects and participation in developing safe operating procedures; team members need to understand individual differences to build a team-based culture and support a change strategy.

### PERSONAL DEVELOPMENT OF FIRST LINE SUPERVISORS

Using an instrument such as TAIS® is only part of the 'plan, provide, maintain and transition people' process which was to be a 'support' process within an organisation's management system. It can be seen as a system to manage, control and assess risks in a systematic way not simply compliance to a range of external regulatory elements. So, with this background, people development is critical and that it is based upon both competency and capability.

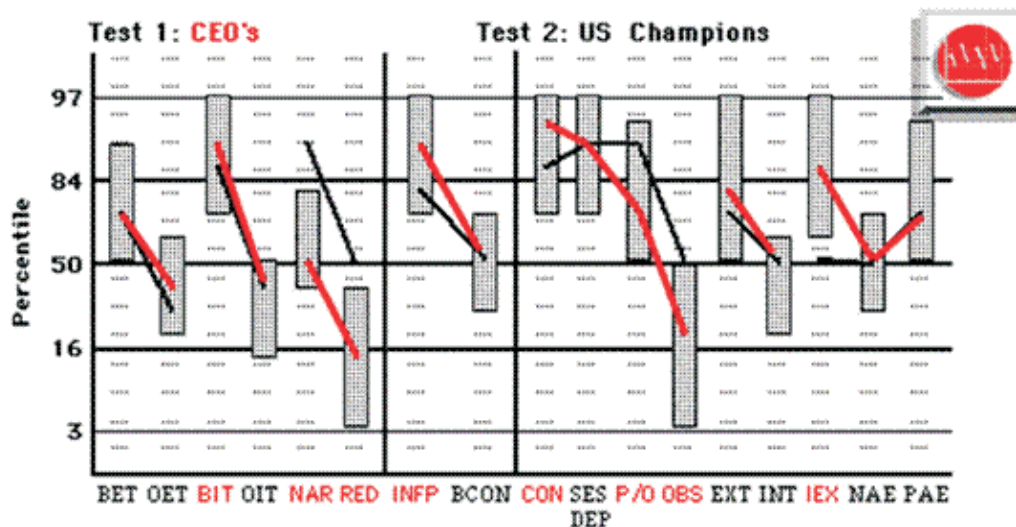


FIG 11 - TAIS® report.

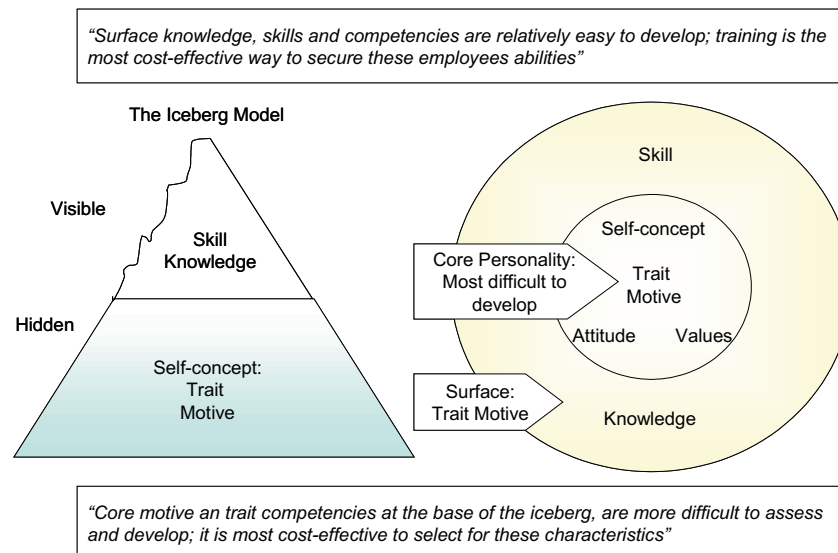


FIG 12 - Central and surface competencies (Spencer and Spencer, 1993).

Using the following definitions:

- 'A competency' is an underlying characteristic of an individual that is causally related to criterion-referenced effective and/or superior performance a job or situation (Spencer and Spencer, 1993). Competencies include skills, knowledge, attitudes, values, self image, physical characteristics, and motives.
- 'Capability' is the potential of the person doing the job, it is about an investment in the future and grooming for the job.

Our experience is that specific development for first line supervisors is critical as they are the custodians of the culture. Their behaviours impact strongly on the outcomes of the change management strategy.

While being faithful to the concepts of adult learning as espoused by Knowles (1988) the minimum critical training for this group of people is as follows:

- *Counseling skills for performance management*; addressing:
  1. expectations,
  2. below par performance, and
  3. continuous motivation.

This should become part of the management system.

- *Leadership practices and followership behaviours*; this is based on the premise that leaders are as only as good as their followers and without followers there would be no leaders and further management skills and leadership skills while they can co-exist are not interchangeable concepts.
- *Practices of authority, accountability and responsibility*; as described by Jaques (1998):
  - 'A' is the manager of 'B' who in turn is the manager of 'C';
  - A holds B accountable for the output of C;
  - B is accountable to A for his/her own personal effectiveness and the output of C;
  - C is accountable to B for his/her outputs; and finally
  - to be effective, B must have the authority to:
    - decide what work assignments C takes on,
    - decide on the personal effectiveness of C,
    - decide by veto or removal who has or remains in the job, and
    - decide on the development program of C.

## CONCLUSION

When we talk about socio technical systems, we are not talking about the mistakes made in the past where the work of the Tavistock Institute was misinterpreted as 'self managed teams' or 'democratic participation' or similar. What we are talking about is the optimisation of people, machines and resources and further, that the traditional concepts of using capital investment to improve productivity will not optimise the resource.

We insist on developing a big picture description of what the future looks like and we believe the future can be manufactured. We honour the hierarchy where A holds B accountable for his/her output and the output of C.

We acknowledge that attitudes and values are competencies and are the top priority in hiring decisions. We advocate that peers hire their team members, the as recruitment of the right people in the first instance is critical in the performance of a mine.

We know that training is a line accountability. Our experience tells us that a five-day induction program is crucial to effective on-the-job performance. We know that in each organisation there are two systems: a social system and a technical system.

We know that no two organisations are the same.

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