MINE MANAGEMENT IN THE 21ST CENTURY

By

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ABSTRACT

Over the past forty years colliery management has coped with intensive mechanisation and other rationalisation of traditional conditions to accomplish increases in outputs by miners, mines and nationally. The basic managerial function of planning, organising, directing and controlling have adjusted and expanded to current management demands, including the detail of achieving the highest possible efficiency, particularly in forward planning. Although industrial aspects have vastly improved, there are lingering problems. Safety is not necessarily the basic ingredient of any industrial event which occur but is always paramount. Likewise some legislative changes may have elements of political and particular vested interests and conservation of technical expertise may be threatened by such frustrations.

Not only technical excellence is required, but particular attributes of the individual are required in management evolving from "simple owner management to the complete corporate approach required for the multidisciplined operations of to-day".

INTRODUCTION

There is a maxim which loosely translated states "that those who do not read history will be condemned to relive it." With this in mind the authors have endeavoured to trace the course of mine management prior to the present time with the object of making some predications as to where the science of art may reside in the years to come.

"The Science and Art of Mining" was an English mining journal founded in 1899 of which the last issue appeared in February 1966. Apparently its authors found no reason over all those years to delete the term "art" from their title so that presumably there will still be a quantum of that element remaining in the years of the 21st Century.

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POST WAR MANAGEMENT

BACKGROUND

Although black coal mining management is almost as old as the colony of Australia itself and mechanisation in some form or other has been around since the late 1800's, the period of development of management in the form as seen today could well be said to have commenced in the years following the termination of World War II.

Basically it was recognised at that time that mechanisation was the key to the problem of Australia's chronic shortage of black coal and around 1947 measures were taken to accelerate the introduction of machines so that eventually all underground mines were completely mechanized and operating on a continuous basis five days per week.

In terms of management know-how this meant changing from a one shift per day operation by contract miners hand filling at an overall output per man shift (OMS) of 2.6t in 1948 to 13.9t in 1965 (Anon 1988).

All of the foregoing did not take place overnight but is sufficient to indicate that immense changes in the scope and depth of colliery management have taken place over the last forty years and are continuing to do so.

There are two main aspects in the simplified approach to future management:

1. the Manager - his perceived necessary attributes and skills, and
2. the Tools of Management - those functions and systems which can be called to account in assisting in the discharge of the overall control of the colliery as a viable enterprise.

THE MANAGERIAL FUNCTIONS

Speaking of the Colliery Manager it would be difficult to argue that the prime requirement is his technical capability and has been over the history of coal mining, although now the source of power at the mine is electricity not steam, and coal is conveyed by rubber belting and not wire rope. Still the
technical context consists of machines and structures and is fundamentally the same. That technical progress will continue to expand and become more complex is without doubt but in the long term will remain precise, predictable and capable of solution.

Operative functions in the field of management can be broadly classified as follows and can be said to be reasonably stable in prediction if not in implementation,

1. planning
2. organising
3. directing, and
4. controlling.

PLANNING

In the early post war period a large underground mine could produce around 600,000 tonnes per annum (TPA) with about 600 employees, so some flexibility in time was available due to the slow rate of advance, in the event of unforeseen circumstances.

Admittedly planning has been upgraded in the geological sense by improved exploration techniques, geophysics, rock mechanics determinations, etc but on the other hand extraction rates are tipping the scale in the other direction.

As of May 1987 the average daily output of longwall faces in New South Wales (NSW) was 6188 tonnes as against May 1985 of 4327 tonnes (Anon 1988). Already daily outputs in the region of 40,000 tonnes per day are being spoken of and will no doubt occur in the foreseeable future. Figures of over 10,000 tonnes per individual face are fairly common place already.

The foregoing seems to point the way to some contingency planning or alternative cash flow bookkeeping when longwalls of such capacity are brought to unscheduled stops.

The immense potential of production for longwall faces (as yet unrealised) and the working conditions they demand together with their extremely high capital cost, will demand, and should ultimately be granted, the right to operate on a seven day per week basis. The typical case will then be large power station operating seven days per week fed by a mine or mines working on the same basis.

A specific example of a longwall production unit has been chosen as one of many situations which did not exist in 1947 or which has undergone serious transformations, such as environmental factors and modernising statutory legislation.

It is therefore clear that although the basic problems which confront management have not altered, their scope and intensity have, and the time frames to which the functions must conform have shrunk so that there is little inbuilt contingency margin. Thus on a five days continuous work schedule there exists some possibility of recovery from unforeseen circumstances in a seven day calendar week. A seven day working week considerably reduces this possibility and presents demands for new standards of operational reliability.

ORGANISING, DIRECTING AND CONTROLLING

As the other three management functions, organising, directing and controlling follow in line sequence from the decisions made in planning, it is not proposed to deal in detail with each one except to say that they suffer in some degree as planning has to the technical, social, environmental and attitude changes of the world as is known to-day.

CURRENT MANAGEMENT

MINING LAYOUT

In order to gauge the changes which managements can expect as they move into the 21st century, some appreciation of the changes in operations from post war to current times is needed.

As indicated above there were changes in the rates of development from the contract or hand-filled days to the mechanised mining days.

Current management may not be aware that mining operations used to be restricted to day shift only. Special agreements were required in order to cut or load coal on afternoon shift and they only after a case had been established for special circumstances, or unforeseen difficulties in pit room which would result in a loss of jobs of massive losses in production.

Increased emphasis on the need for substantial increase in raw coal production gradually led to three shifts per day operation then the reduction in weekly working hours from 40 to 37.5 and then to 35.

These rapid changes in operations meant that managers were required to "think on their feet" as well as adapt to a more rapid exploitation of reserves. A review of mine plans of the first generation mines (up to 100 years old) indicates these changes as they repeatedly show that the latter 20-30 years of operations roughly equates in areas worked out to the previous 70-75 years.

This rapid exploitation of reserves coupled with the reduction working week spelt the end of the first generation mines and identified the need for second generation mines.

Forefront in the minds of planners, designers and shareholders were the requirements to address the following in order to improve efficiency.

1. an increase in machine operating time,
2. an increase in tonnes per labour hour,
3. a reduction in total travelling time for men and materials,
4. a reduction in total manpower due to rapidly escalating labour costs, particularly in the early to mid 70's, and
5. an improvement in the quality of service roadways as they affect,
   a. roadway maintenance labour,
   b. re-support material costs,
   c. roadway failure risk costs.
D.A. Clark and C.H. Martin

d. high air current velocities as they impact on outbye airborne dust and ventilation costs,
ed. optimisation of numbers of development roadways, and
f. transport of larger and heavier machinery.

These requirements then identified the need for managers to be more aware of the impact of financial matters in their forward planning for new generation mines. The jargon of the accountants gradually entered the vocabulary of mine managers as they grappled with cash flows, net returns on funds invested, discounted cash flows, etc., and as competition for capital funds intensified particularly in large diversified companies.

INDUSTRIAL

The first 100 years or so of mining in this country were extremely difficult and relationships were best summarised in the Royal Commission findings (Drake Brockman, 1939) when he concluded (in respect of industrial relations) "that the history of the coal mining industry in Australia from its very inception could best be described as an unbridled and unregulated contest between employers and employees, without restraint, actuated only by the laws of the jungle".

Quite clearly the practitioner in the industrial relations arena was often faced with the dilemma of dealing with the 'facts of the case'. Many disputes leading to cessation of work and extended stoppages were spuriously branded "safety issues" and analysed as real safety issues in the belief that no one in the industry would ever challenge the need for improvements in safety.

In the contract mining days many safety disputes emerged as a cover for the need for a holiday or a spell by miners who had either become over tired by the contract "job and finish" concept or by those who had little inclination to expend the extra effort in difficult or deficient mining places.

Post-war mechanisation changed the contract system to day-wage and some quickly realised that work output was not proportionate to rewards, and that disputes regarding manning levels, with safety highlighted, was a way to reduce the daily energy expended. Often 'safety' disputes were intended to preserve the more lucrative aspects of contract mining and were so successful in this regard that "machines in pillars" were banned by the laws of the day.

The real facts were that miners permitted machines in the more arduous parts of the contract mining system but machines were banned on 'safety reasons' from pillar extraction which was the easiest, most productive and lucrative section for contract payment. Consequently millions of tonnes of coal in this State were lost and were beyond recovery by the time the Coal Mines Regulation Act (CMRA) was changed.

It is noteworthy that increased attention by management to reductions in injury potentials, the emergence of mine site safety committees and the emphasis on the individual's responsibility to safe working led to a dramatic reduction in local or home grown disputes resulting in lost production days.

One must be very concerned however at the numbers of lost production days which have their origin at district or national level. An examination of the statistics for the three years 85-87 inclusive shows that lost time due to non mine site disputes averages 10 days per year. All parties must ask the question: "Can we as a nation with a serious balance of payment problem afford to forego massive revenue in an industry where the individual is well paid, has generous working hours, superior annual and long service leave provisions as well as excellent on site working conditions?"

This theme was developed in detail by Story, (1987) when he said: "Typically, underground coal miners work five hours out of a seven hour shift, with the remaining two hours being accounted for by travel time, and "crib break". If a seven and a half hour shift is required, overtime must be paid for over a seven hour shift. As a consequence most underground coal miners work four hours, five days a week or 100 hours a week out of a total 168 hours per week. This is 83 per cent of available hours in the 24 hour working day. The Australian coal mining industry is closed for Christmas and for three weeks every January. In addition, the industry is closed for one week during Easter and again for one week during the August school holidays. The bottom line is that the coal industry is permitted to work on only 292 days of a 365 day year or 63 percent of available days in a full year. The net results of working 83 percent of possible hours a day for 63 percent of the possible days in a year is that the total Australian coal industry is working only 52 percent of the available number of hours in a full year. This is before routine maintenance and other breakdowns reduce the effective working hours to even less than half the available time. The picture is even worse when one accounts for the statutory three days per year and discounts statutory long service leave days, compensation and sick leave days.

These aspects should be however at the individual's potential and management as they look to the 21st century and compare themselves to other nations.

LEGISLATION, REGULATION AND OTHER MATTERS

In the post-war years the industry underwent very little legislation which became increasingly out of date, and which led to significant economic pressures. Despite these..."
practical men with that quality of common sense the 1982/84 Coal Mining Act and its regulations evolved as a piece of legislation conceived by the association of political and vested interests groups each endeavouring to extract the maximum value with minimum obligation.

It is interesting to examine the list of NSW mines which closed down in the 5 year period immediately following the introduction of the 1982/84 CMHA:
1. Newcastle District - Burwood, John Darling,
2. South Coast - Avondale, Yellow Rock, Avon,
3. Western District - Grose Valley, Fernbrook,
Wallerawang.

Has the financial impact of the new CMHA imposed economic pressures resulting in these closures? Can this massive loss of capital investment be afforded and what lessons can be extracted for the future?

Similarly the industry has lost the skills of many highly experienced and trained people. Many experienced managers, whose exist was common sense were pressured out of the industry by threats of prosecution, legal action and bureaucracy.

The danger signals from the CMHA are there and these are being followed in similar manner by the intrusions of state and local government authorities into the direct and indirect operation of all mines both underground and surface.

In his paper Hetherington, (1978) identified seven major government authorities which were required to provide environmental approval for mine operations and listed other authorities which were also required to be consulted (where applicable). This list totalled some 22 authorities and in the years 1978-1988 the list has expanded by the inclusion of co-ordinating groups and the restructuring of the old Mines Department under the care of two Ministers of the Crown. The end result is that operating costs and time delays have continued to increase.

One must also recall the Coal Acquisition Act and the resultant confiscation of assets of mining companies. An examination of the latest NSW Governmental reports shows claims, number of govt. staff, etc, and raises the question of cost versus benefit. Clearly the only benefit has been to the confiscator!

MINE PLANNING

The need for the development of the second generation mines and the necessity to make provisions for future capacity is highlighted as an example in the case of Appin Colliery. Design for this mine commenced in the late 1950s with production commencing in 1962. At the time of design the larger mines of Australian Iron and Steel Pty Ltd were operating in the range of 2000-2500 TPD and Appin was designed as a 5000 TPD operation. That figure later proved to be well below operational potentials with the longwall alone producing at times in excess of 15 000 TPD.

This exposes the frailties of the modern or future manager to conceive and appreciate what will be required of his mine in the next 20 or 25 years. It is quite clear that the concept Carthew (1987) described as "the evolution from simple owner management to the complete corporate approach required for the multi-disciplined operations of today" will need even more refinement of vision and application in the future.

CHANGES FOR THE FUTURE

THE INDIVIDUAL

Despite Aldous Huxley's predictions in "A Brave New World", designed 1932 and the promise of "in-vitro fertilization" which seems a step closer to bringing forward the day when the qualities and attributes of a future person can be built into the foetus, 1988 seems no nearer to producing, in the first place, managerial material for any given purpose, than it ever was.

As the foregoing is still academic to the point of Privity, even in this age, it will be that managerial material will emerge as it ever has, from the work environment in which it has evolved, after entering that organisation with the basic technical education. Some person or persons presumably with superior management skills will deem the embryo manager worthy of further development in what was once called the "common sense" attributes, but as this is too broad a term it is preferred to specify them in their various classifications. Thus we have at random some of many: accountability, reliability, persistence, problem solving, communication ability, and loyalty. The list goes on and on.

It would then appear that the candidate has all of these virtues to some degree or an outweighing number to a greater degree.

On this basis then the aspiring manager can with his own efforts and expert outside assistance increase his abilities in these areas in which he himself or his employer discern there is a deficiency.

This is not to overlook the value of "on the job training" which is a continuing basis, whether the recipient likes it or not, and subconsciously or consciously to the willing mind will continue to refine a manager's operational skills.

PHYSICAL HEALTH

This matter is already receiving a great deal of attention at a number of levels and can be viewed from the point at which the executive is completely unable to cope with his duties to where there is a serious reduction in efficiency not only for the person to warrant absence from the job, who makes this decision as to whether it is better to suffer some loss of administrative drive rather than the dislocation of a stand-in executive for a...
short period? The majority of union employees solve this problem by taking a 'sickle' or 'compo' as frequently as possible and presumably remain in excellent health until the next long week-end or the test team comes to town.

MENTAL HEALTH

The effect of mental vagaries on general performance is recognised but as yet not clearly understood or evaluated. The common de-stabilisers, over-work and prolonged period of high stress can be observed and detected but as yet there seems to be no mechanism for determining their effect on the recipient. There are a host of other factors outside the workplace the effect of which can also be of serious impact, such as living environment, domestic situations, etc., etc.

In conclusion when one examines the total remuneration received by some executives in the world - a million dollars per annum - and the colossal blunders in management that have been committed by these same people it will be of little wonder that if in the future some precise means of monitoring a person's mental health will become mandatory at higher executive levels.

EXTERNAL FACTORS

It has been said and frequently quoted that there are only two things in life which are certain - death and taxes. Perhaps could be added to this a third increasing government regulations.

When one considers the proliferation of government or semi-government bodies with involvement in the mining industries and extrapolates this into the future, one must ask 'where will we be in the 21st century and can the economy of the nation sustain this burden?'

Management must be free to manage their operations on viable bases and be freed of the shackles of bureaucracy which are adding almost daily to the cost pressures.

CONCLUSION

It seems that a very precise definition of the nature and function of a manager in the 21st century presents an extremely difficult exercise in imagination and prognostication.

One cardinal feature remains that he must at all times be in control of the situation and strongly resist unwarranted intrusions both internal and external to his operations.

In the past he may have been the fount of all wisdom and knowledge and whilst it is conceded that he does require assistance and advice from technical and other experts in their respective fields, he must still be in a position to give the final decision and exercise control of the end result.

Successful companies are epitomised by good leadership, strong direction and close identification and association of common

REFERENCES


