



**BEST PRACTICE  
ENVIRONMENTAL  
MANAGEMENT  
IN MINING**

Planning a Workforce  
Environmental Awareness  
Training Program



Environment  
Protection Agency



Organisational leadership drives organisational culture. The purpose of leadership is to develop, support and improve the performance of a group of people so that they continue to achieve objectives over time.

A leader then is a person who shapes and manages organisational values within his/her sphere of influence.

Environmental leadership can be demonstrated by:

- an environmental policy that includes an organisation's environmental values and vision;
- application of an integrated environmental management system;
- board members who take the trouble to understand environmental issues and concepts, responsibilities and practices;
- environment being a demonstrated priority for senior management;
- supervisors conducting environmental training and awareness sessions for workforce performance; and
- environmental performance as part of managers' performance review.

Pitfalls include management:

- not communicating the organisation's values and environmental policy;
- issues/problems not clarified or prioritised for action;
- raising an expectation and not following through;

- measuring performance solely on production, with no penalty for poor environmental performance;
- not understanding environmental implications of activities; and
- not demonstrating knowledge of broad environmental issues, eg greenhouse, ozone.



**Table 3**  
LEADERSHIP – ANALYSIS AND BENCHMARKING

| SUCCESS FACTOR                | PERFORMANCE RANGE                  |   |  | PERFORMANCE MEASURE AREAS  |
|-------------------------------|------------------------------------|---|--|--|
|                               | COMMON                             | GOOD  | BEST PRACTICE  |  |
| <b>Commitment</b>             | No corporate policy.               | Explicit guidelines.  | Corporate Environmental Policy and Business Unit Environmental Policy.                                     | Presence of a Corporate Environmental Policy.                        |
| <b>Accountability</b>         | Informal reference to environment. | Accountability of environmental roles for some key areas.         | Accountability at senior management level plus specific accountability of managers/employees in all areas. | Presence of systems to validate accountability.                      |
| <b>Personal demonstration</b> | Directives from senior management. | Managers publicly and privately stating environment is important. | Senior management actively involved in supporting and maintaining environment initiatives.                 | Employee perception of managers' personal commitment to environment. |

## CASE STUDY 3

### WAPET

In 1994 West Australian Petroleum Pty Limited (WAPET) was awarded the Australian Minerals and Energy Environment Foundation Excellence award. The award recognises the 'preservation of the flora and fauna of Barrow Island, a Class A nature reserve in Western Australia, during 30 years of oil exploration and production'.

In the face of a tight business schedules and budgetary constraints, WAPET's Managing Director interrupted a business trip in Japan to underscore his commitment to the organisation's environmental program. He flew to Australia from Japan on the last available flight, accepted the award together with WAPET's Environmental Coordinator and a representative of the Barrow Island workforce and then he caught the next available plane back to Japan.



A team is a group of people who interact to achieve a common purpose. Teamwork is achieved through the positive interaction (synergy) of team members who can draw from a wide range of skills and knowledge.

Teams can have many forms, ranging from a highly structured situation where decisions from the executive are performed by team members, to self-managing teams that operate almost autonomously, with limited management control.

An effective team can result in good environmental performance because it can:

- increase employee motivation and commitment;
- lift morale;
- raise job performance;
- generate ideas;
- provide an important informal training function;
- improve cooperation and communication; and
- identify environmental risks to test disaster planning.

Pitfalls to avoid include:

- lack of support by a senior manager;
- managers feeling threatened, perceiving a loss of decision-making power;
- managers feeling they are losing their star performers;
- little performance feedback;
- insufficient allocation of time and resources to the task;
- unclear accountabilities;
- including environmental input only where environmental problems are obvious;
- need for unplanned additional resourcing;
- unclear purpose and/or operating boundaries;
- insufficient team training resulting in inability to understand the issue;
- poor understanding by team members of individual and collective benefits;
- team members do not see how they can win both individually and collectively;
- lack of respect for different opinions;
- non-recognition of team; and
- too many teams.

**Table 4**  
T E A M W O R K – ANALYSIS AND BENCHMARKING

| SUCCESS FACTOR                                  | PERFORMANCE RANGE                             |  |   | PERFORMANCE MEASURE AREAS                                       |
|---|---|--|---|---|
|   | COMMON  | GOOD   | BEST PRACTICE   |   |
| <b>Shared environmental values &amp; vision</b> | If policy, no values statement.               | Some understanding of what values are shared in organisational environmental policy. | Explicit shared values/goals/vision in environmental policy.        | Environmental policy statement including values statement.      |
| <b>Self-managing teams</b>                      | If teams, then operate according to function. | Multi-disciplinary teams established.  | Multi-disciplinary teams include members with environmental skills. | Number of multi-disciplinary teams including environmentalists. |

## Argyle Diamond Mine

Argyle Diamond Mines Pty Limited (ADM) manages and operates open cut and alluvial diamond mining operations in the Kimberley region of Western Australia. The mine is 30 km from Lake Argyle, Australia's biggest freshwater lake. The Operations Division's Draft Environmental Policy contains the following values:

- practical and sound environmental management founded on scientific fact;
- creativity through investigation of and research on environmental impacts and opportunities;
- teamwork and cooperation in environmental management;
- environmental responsibility as a corporate citizen and member of the local community; and
- understanding and enjoyment through involvement and training in environmental matters.

In response to a key audit finding, ADM established a multi-disciplinary (cross-functional) team to develop strategies to reduce the impacts of hydrocarbon waste by improving hydrocarbon management. The team was known as the Oil Improvement Lobby, or OIL Team.

The OIL Team comprised the Environmental Superintendent, an external consultant and employees from all relevant functional areas (eg Mining, Process, Logistics etc). Team members ranged from those in hands-on 'shop floor' roles, through to those primarily involved in people management.

The OIL team initially established its understanding of the task, its process for operating as an effective team and the resources available. It also defined its communication strategy, which included a commitment to face-to-face communication with employees.

As an objective, the team set itself the goal of zero hydrocarbon discharge, consistent with ADM's vision to '... make Argyle the best mining operation in the world'. The OIL Team identified and measured the process of hydrocarbon use, sources of contamination and waste.

Their first target was to minimise the sources of discharge and redesign some processes. Once this had been done and implemented, the team successfully sought funds to design and establish a waste water treatment facility to recover hydrocarbons and to recirculate discharge water for reuse by ADM.



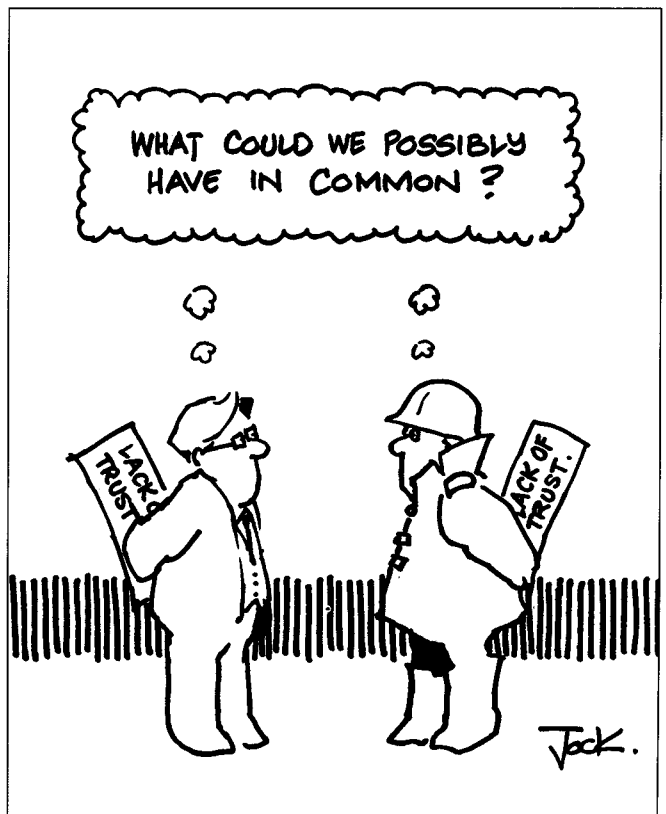
Understanding is about perceiving the meaning of, or knowing how to deal with, a situation. Training is the process of helping individuals to enhance their knowledge and to learn new skills, to allow better understanding to deal with new situations.

Training effectiveness is part of environmental care which, in the event of an environmental incident, becomes part of environmental due diligence. Delahaye and Smith<sup>4</sup> reported, from a related industry, the case of a liquefied petroleum gas (LPG) tanker filler who was dismissed for overfilling customers' LPG tanks. The Queensland Industrial Court focussed on the effectiveness of the organisation's safety training. The Court held that the offences of overfilling resulted from ineffective training. The lesson from this decision is that training of itself may not be enough: organisations may have to prove that the training is effective.

Successful and effective training depends on analysing the gap between an organisation's actual and required performance. Training needs analysis should not be restricted to technical needs: it should look at the wider issue of organisational culture and individual need. With this understanding appropriate training aids can be developed.

It is beyond the scope of this module to list and discuss the merits, or otherwise, of available training aids. The strengths and weaknesses of these aids are well documented in publications such as Kroehnert's *Basic Training for Trainers*.<sup>5</sup>

Mindful that 90% of employees prefer to receive important information from their supervisors, training will, ideally, be conducted by managers with the support of environmental experts.



4 Delahaye B and Smith B 1987

5 Kroehnert G 1995

Environmental trainers, therefore, can assist managers by:

- conducting a training needs analysis;
- establishing policy on training program objectives and structure;
- developing train-the-trainer programs including trainer information kits and aids;
- providing expert advice;
- conducting training evaluation; and
- maintaining full training records.

When developing a program, it is useful to remember that:

'People learn better when they are actively involved in the learning process.

People learn better when they're using as many senses as appropriate.

It is generally recognised that people retain about:

- 10% of what they hear;
- 30% of what they read;
- 50% of what they see; and
- 90% of what they do.<sup>6</sup>

Pitfalls to avoid include:

- unmotivated trainers;
- managers lacking credibility;
- training aids inappropriate to the task requirements;
- inappropriate tools for the target audience, eg written words for illiterate employees;
- not measuring feedback to ensure understanding; and
- not understanding why there is employee resistance to undertake training.

**Table 5**

**UNDERSTANDING – ANALYSIS AND BENCHMARKING**

| SUCCESS FACTOR   | PERFORMANCE RANGE  |   |   | PERFORMANCE MEASURE AREAS   |
|------------------|--|---|---|---|
|                  | COMMON   | GOOD  | BEST PRACTICE   |   |
| <b>Knowledge</b> | Environment viewed with suspicion as a quasi religion not as a legitimate business issue. Confusion of what environmental issues are and how they relate to the organisation's activities. | Employees and managers know the key issues facing the mining and petroleum industry and the organisational unit in particular. Induction program for employees. | Employees able to understand local and global environmental impacts. Multi-media approach to environmental training. Annual induction/ refresher program for employees and contractors. | Employee and management exposure to environmental awareness raising tools eg videos, brochures. Benchmarking of level of understanding. |
| <b>Skills</b>    | Little application of skills in solving environmental issues.  | Employees understand rationale behind impacts and actively seek solutions.  | Employees and contractors understand rationale behind environmental impacts and develop documented procedures to reduce impacts.  | Application of the knowledge to solve environmental issues and to develop procedures.   |

<sup>6</sup> Lewis W J 1989

## SANTOS

SANTOS Australia explores and extracts natural gas and oil in the Cooper Basin in north-east South Australia and south-west Queensland. The company operates within several land system types including dune fields, flood plain, stony plains and tablelands.

SANTOS is responsible for its large contractor workforce, management and production, and exploration and drilling. The challenge for SANTOS was raising environmental awareness, with limited resources, for all managers, employees and contractors.

A consulting company has helped to develop computer software for employee and contractor induction. A separate but linked safety program has also been developed.

Employees and contractors are inducted at the site by the safety officer. Participants are briefed and required to undergo a multi-media induction program annually.

Following a welcome and overview of operations, participants are seated in front of a colour, touch-screen computer. To the trainee the computer looks and behaves like a television screen. However, the employee controls the program pace through the touch screen commands. Once the trainee has typed his/her name the information is communicated as text across the screen defining SANTOS's environmental objectives. In addition to the text there is a voiceover from speakers connected to the computer, describing the program's contents.

Graphics, still photography and moving images all contribute to the text and voiceover as the trainee works through the program. At the end of the session, which lasts approximately 20 minutes, participants must answer a series of multiple choice questions that test understanding. If after two attempts a trainee cannot answer a question correctly, then the relevant section is automatically replayed and the trainee retested.

An important aspect of the induction program is the use of a local newsreader who was selected because:

- workers were used to being informed by this person;
- he was credible with employees and contractors, having a distinctive local accent; and
- he was sensitive to the need to avoid the use of jargon.

Other benefits of SANTOS's multi-media system include:

- one-on-one training avoiding the embarrassment of asking 'stupid' questions;
- self-paced learning;
- cost-effective hardware and software with costs recovered within 12 months (measured against using a dedicated trainer working with a group of 10 trainees);
- the development of contractor-specific modules;
- existing safety staff managing the interactive system;
- improving the connection between environment and safety; and
- semi-literate/illiterate participants have the messages read to them;
- keyboard skills not being required.



## CASE STUDY 5B

### Alcoa – corporate environment training tailored to a local operation

In response to the challenge of delivering a consistent environmental message to its international operations, the Aluminium Company of America (Alcoa) has developed a comprehensive instructor guide entitled *The Environment: We make a difference*. The guide, developed by a team of representatives, drew from 30 locations worldwide.

Alcoa's training and awareness program has clear learning objectives for its target audience — Alcoa's employees. The objectives are to increase awareness of:

- basic environmental impacts; and
- how actions play a significant role.

The course does not assume participants have a background knowledge in environmental matters. Each module is supported by an instructor guide.

Alcoa recognises the need to be sensitive to local culture, and in its introduction states: 'Inevitably, a course that will be used by such a culturally diverse and geographically separated audience requires some customising. The course was pilot tested during development. It is recommended that each location conduct their own pilot after the course has been customised.'



An integral aspect of organisational culture and a vital component of the communication process is recognition. Positive and negative reinforcement make up recognition. Skinner, in Peters and Waterman,<sup>7</sup> has identified four hallmarks of recognition. Recognition:

- needs to be specific to the task;
- should be immediate;
- should take account of the achievability of the task; and
- requires meaningful attention from top management.

A major aspect of recognition is management being seen to take responsibility for assisting employees to meet all the environmental demands placed on them in a workable, safe, efficient and satisfying manner.

Management appraisal of personal performance leads to positive and negative recognition of work done. Jaques and Clement<sup>8</sup> identified six methods to recognise personal effectiveness. They are:

- verbal recognition — everyday verbal recognition (including non-verbal body language);
- task recognition — where employees are assigned tasks with either career limiting or career development opportunity;
- recorded verbal recognition — an away-from-work situation with an opportunity to discuss agreements or disagreements — is held on record and considered during annual review;

- broadened or narrowed task type — the complexity of tasks is changed, depending on feedback on task performance, and recorded as part of the employees' record;
- merit award — where employees get an annual merit pay increase; and
- recommended upgrading — promotion.

Short term financial rewards can often send the wrong message.

'Our advice is to put away incentives, bonuses and other ... theory conditioning approaches, and get on with ensuring the conditions for effective managers to recognise good work, encourage it, pay fairly for it, and provide managerial leadership that lets everyone get on with their work.'<sup>8</sup>

Pitfalls to avoid include:

- alienating team members by acknowledging and rewarding one team member only;
- giving a gift with no lasting benefit/value;
- creating a 'what's in it for me' culture by rewarding people to do everyday tasks;
- encouraging competitions that create an 'us and them' culture inhibiting information/resource sharing;
- providing untimely and inappropriate feedback; and
- insincere acknowledgment.

<sup>7</sup> Peters T J and Waterman 1982

<sup>8</sup> Jaques E, and Clement S D 1991

**Table 6****RECOGNITION – ANALYSIS AND BENCHMARKING**

| <b>SUCCESS<br/>FACTOR</b> | <b>PERFORMANCE RANGE</b>  |   |  | <b>PERFORMANCE<br/>MEASURE AREAS</b>   |
|---------------------------|---|---|--|--|
|                           | <b>COMMON</b>   | <b>GOOD</b>   | <b>BEST PRACTICE</b>   |  |
| <b>Acknowledgment</b>     | Little if any acknowledgment for environmentally responsible initiative(s). | Managerial acknowledgment of team/individual for environmentally responsible initiative(s). | Organisational acknowledgment for environmentally responsible initiative(s). | Presense of systems in place to acknowledge environmentally responsible initiatives. |
| <b>Reward</b>             | Few resources allocated to environment and no rewards provided.             | Cultural rewards for some environmental initiatives to show management appreciation.        | Use of reward(s) as a tool to encourage cultural change.                     | Mix and type of cultural rewards eg peer and management acknowledgment.              |

## BHP Coal

BHP Australia Coal Limited (BHP) is committed to integrating environmental concerns into its management system.

BHP, in association with the Queensland Vocational, Training and Employment Commission for Accreditation, has developed a self-paced and self-directed competency-based training program. The program comprises over 100 training modules. The training modules appropriate to individual employee needs are identified during the Career Development Planning process.

The competency-based training program includes such environmentally related topics as:

- hazardous substance usage;
- managing the work environment;
- reclamation and rehabilitation; and
- managing water supplies.

Additional modules are developed according to need. A typical training module lasts about 30 hours. Half of the training is out of work hours, demonstrating a shared commitment from both parties.

Assessment is through written tests and observation of competency in an auditing process. Demonstration of competency results in national certification for competence under the National Framework for the Recognition of Training.

As a consequence of competency-based training and awareness, employees who complete agreed modules can look forward to:

- an increase in pay scale;
- being scheduled onto other equipment leading to greater career opportunities;
- peer recognition; and
- improved recognition and employment opportunities within the mining and petroleum industry.

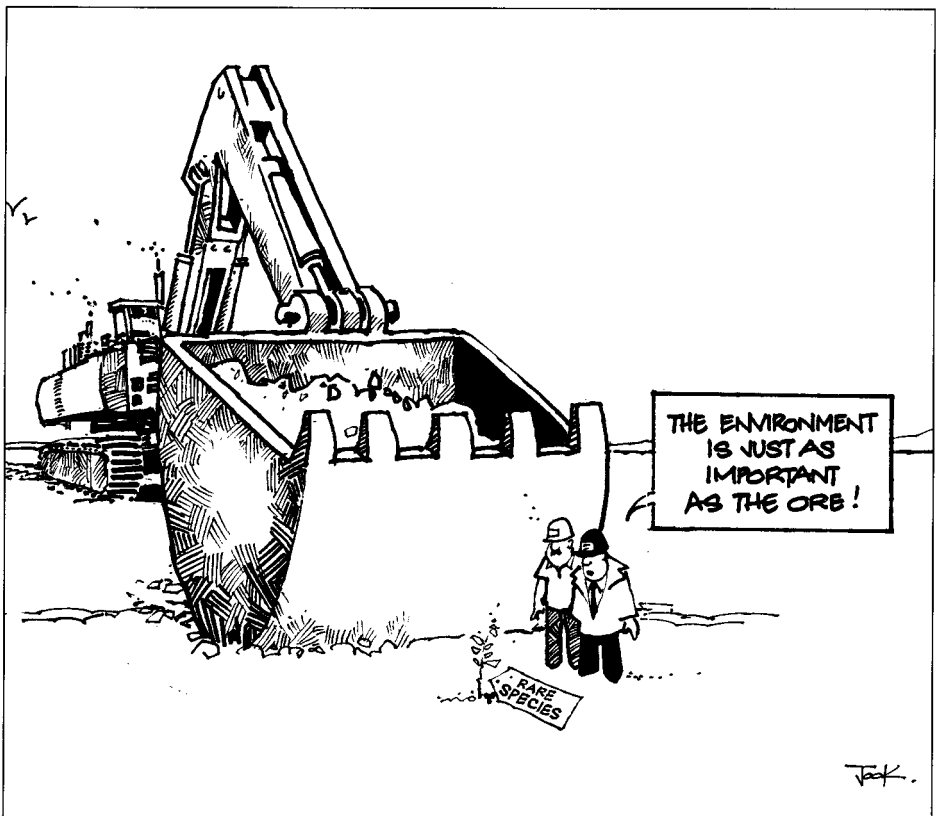


Empowerment is the act of giving power to others. Empowerment requires the delegation of responsibility to team member(s) to undertake a task. The delegated team member(s) are responsible for their actions. However, while responsibility and accountability go together the manager is delegated to account to the organisation on achieving overall objectives. Accordingly managers are responsible to the team to ensure tasks are evaluated and suitable feedback (both positive and negative) is given.

Empowerment can increase job satisfaction and lead to:

- higher morale;
- lower staff turnover;
- employee initiatives appropriate to the organisational culture; and
- improved environmental performance.

Managers will not delegate responsibilities unless they are confident the team or person they are empowering has the necessary knowledge and skills to perform the assigned task.



**Table 7**

**EMPOWERMENT – ANALYSIS AND BENCHMARKING**

| SUCCESS FACTOR                       | PERFORMANCE RANGE  |  |   | PERFORMANCE MEASURE AREAS  |
|--------------------------------------|--|--|---|--|
|                                      | COMMON   | GOOD   | BEST PRACTICE   |  |
| <b>Recognition of responsibility</b> | Only environmental managers seen as responsible for environmental performance. | Environmental managers seen as support role only.            | Environmental team in support role and they are consulted where environmental impacts are likely.           | Documented consideration of environmental impacts in key management decisions. |
| <b>Authorisation</b>                 | Few if any initiatives generated by employees.                                 | Initiatives generated by employees supported by management.  | Delegation of responsibility to employees.<br>Guidance notes on how to undertake environmental initiatives. | Evidence of employee initiatives.  |
| <b>Resource</b>                      | No fund allocation on environmental basis.                                     | Funds allocated on basis of proven operational cost/benefit. | Funds allocated with consideration of operational cost/benefit and organisational image.                    | Number of initiatives supported.   |

Pitfalls for managers to avoid include:

- delegating unpleasant tasks only;
- overloading employees with additional tasks, and not recognising the need for additional time and resources;
- failing to work to an Environmental Management Plan, eg bulldozing a recently rehabilitated dump;
- reluctance to let go of the reins; and
- over-organising the task.

Areas of resistance to overcome include:

**Manager resistance**

- Employees lack the experience
- Takes more time to train than to do
- Mistakes can be costly
- Lack of control
- ‘Easier to do myself’ mentality
- Lack of trust

**Employee resistance**

- Lack of incentive
- No training
- Not used to responsibility
- Fearful and uncertain of task requirements
- Not their job
- Lack of trust

## CASE STUDY 7A

### KCC

Kembla Coal and Coke (KCC) operates in environmentally sensitive areas, including relatively undisturbed areas of Sydney's water supply catchments. Over the past 20 years KCC's seismic operations team, with up to 70 field staff, has determined the geology for underground coal extraction.

Originally the seismic teams cleared trees and scrub in straight lines through the catchments to collect important geological information. These lines can still be seen.

Increasing community, regulatory and organisational expectations of environmental performance led KCC to an inescapable conclusion: if KCC continued its old practices, access would eventually be denied. Drawing on multi-disciplinary skills ranging from geologists and geophysicists to journalists and video producers, KCC developed an exploration program that enabled the data to be obtained and the environment to be retained.

Although facing tight financial constraints, KCC management endorsed the seismic team's objectives. Responsibility was delegated to the Project Geologist by the General Manager.

In conjunction with KCC's Environmental Engineer, the seismic team identified its environmental impacts. Once there was an understanding of the issues, the team set about developing its own solutions. The Project Geologist, together with his peers, developed new techniques for seismic exploration in sensitive areas. To ensure new members of the team understood these new techniques, the team videotaped its progress. The KCC video now forms a part of the induction process and provides useful information on how seismic operations are conducted.

As a consequence, this committed team now has a code of practice, an instructional video and the support of the local community, regulators and the organisation.



## CASE STUDY 7B

### ARCO

ARCO's Gordonstone coal mine is a recent greenfields (a previously untouched area) development. In an effort to communicate effectively to new employees, Gordonstone developed a 90 minute supervisor training program on delivering environmental information to employees. The supervisors then gave 20 minute presentations on environmental issues to employees at monthly toolbox meetings.

At one such toolbox meeting, solvent use was identified as potentially harmful to employees and the environment. Having identified a major problem, the employees set about identifying the critical issues, exploring options and finding a solution. They:

- identified the issues relating to solvent use;
- sought access to the Chemical Substance Information System;
- reviewed relevant data sheets;
- in consultation with the union, identified the major environmental and health impact was caused by a single product; and
- consulted with management.

The product was banned from use within a day.

# THE NEXT STEP

Depending on the organisation's resources, the manager can conduct surveys to determine performance levels for each of the success factors shown in the benchmarking examples given in this module. The surveying program should include:

- a quantitative survey of all sites/business units;
- a qualitative survey, eg using focus groups; and
- management interviews.

These surveys will enable the manager to:

- identify areas of best practice in organisational units, which can then be applied across the organisation;
- understand the organisational culture and determine the factors critical to the future success of the environmental awareness training program;
- report to management on the current level of training and awareness practices relative to stated environmental policy and organisational values;
- identify training and awareness support needs and expectations within sites/business units;
- provide information to sites/business units for awareness-raising purposes;
- establish an internal benchmark to measure progress over time; and
- identify those attributes the organisation is seeking in benchmarking partners.

To ensure the organisation is, at the very least, meeting its legal obligations, the manager should begin with the organisation's environmental induction program. The program should include the induction of both employees and contractors. At this point managers should identify the best practices and the best practitioners in environmental awareness training. Experienced environmental consultants can add significant value to this process.

Best practice and leading practitioners can be found by:

- contacting industry bodies;
- subscribing to environmental publications;
- attending environmental awards and environmental workshops/conferences; and
- seeking suggestions from environmental regulators.

Once potential benchmarking partners have been identified, they can be formally approached. Leading organisations are usually more than willing to share the secrets of their success in environmental awareness training. A methodology appropriate to the needs of your organisation can then be developed.

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# CONCLUSION

|                |  |   |
|----------------|--|---|
| MANAGEMENT     | <p>The goal of environmental awareness training is to achieve an enduring and improving environmental culture that is demonstrated by positive environmental performance.</p>  | <p>The effectiveness of environmental awareness training is difficult to measure, but it is important that managers monitor effectiveness using some of the performance measures provided. Management needs to be reassured the program is delivering cost-effective results against stated objectives.</p>   |
| NEEDS TO BE    | <p>Unfortunately for those organisations seeking to develop or enhance their environmental awareness training, there is a dearth of information.</p>   | <p>Having identified the factors in achieving a successful program, managers should benchmark their program against 'like' organisations that they consider to be among the leading environmental training and awareness practitioners (these need not necessarily be limited to the mining or petroleum industry.). This process will reassure senior management that the organisation is exposed to current best practice, and will provide a stimulus for continued environmental improvement.</p> |
| REASSURED THE  | <p>Many variables influence the timing and content of a program. Therefore this module provides a framework to assist managers in understanding the underlying principles of an effective program.</p>   |   |
| PROGRAM IS     |  |   |
| DELIVERING     | <p>Recognising that all companies, including mining and petroleum companies, have different cultures and organisational visions, a prescriptive approach is unlikely to be helpful or appropriate.</p>   |   |
| COST-EFFECTIVE |  |   |
| RESULTS        | <p>In proposing CULTURE</p>  |   |
| AGAINST STATED | <ul style="list-style-type: none"> <li>Communication</li> <li>Urge</li> <li>Leadership</li> <li>Teamwork</li> <li>Understanding</li> <li>Recognition</li> <li>Empowerment</li> </ul>   |   |
| OBJECTIVES     | <p>as a memory aide, managers can use this to help them identify and consider factors critical to their program's effectiveness. The examples of best practice highlight the inter-relationship between principles, ie influencing one principle will influence, to varying degrees, each of the others.</p> |   |

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## FURTHER MODULES PLANNED FOR THIS SERIES INCLUDE

Overview of best practice environmental management in mining  
Mine planning for environmental protection  
Environmental management systems  
Environmental monitoring and performance  
Environmental impact assessment  
Community consultation and involvement  
Onshore exploration for minerals  
Onshore exploration and development for oil and gas  
Rehabilitation and revegetation  
Prevention and control of acid mine drainage  
Tailings containment  
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Water management  
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Planning for mine closure and decommissioning  
Post-mining land use management  
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Use of wetlands for treatment of contaminated water  
Noise, vibration, dust control, atmospheric emissions and air quality  
Reviewing EIS predictions  
Waste management, disposal and handling  
Cleaner production including energy minimisation

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# Planning a Workforce Environmental Awareness Training Program

One module in a series on

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ENVIRONMENTAL  
MANAGEMENT  
IN MINING**

Environment Protection Agency

June 1995





# FOREWORD

Environment protection is a significant priority for our society. For government a major role is setting environment standards and ensuring individuals and organisations meet them. Also government, industry and community organisations are working increasingly as partners in protecting our environment for present and future generations.

Representatives of the mining industry in Australia and the Environment Protection Agency, an agency of the Australian Department of the Environment, have worked together to collect and present information on a variety of topics that illustrate and explain best practice environmental management in Australia's mining industry. This publication is one of a series of modules aimed at assisting all sectors of the mining industry — minerals, coal, oil and gas — to protect the environment and to reduce the impacts of mining by following the principles of ecologically sustainable development.

These modules include examples of current best practice in environmental management in mining from some of the recognised leaders in the Australian industry. They are practical, cost-effective approaches to environment protection that exceed the requirements set by regulation.

Australia's better-performing mining companies have achieved environmental protection of world standard for effectiveness and efficiency — a standard we want to encourage throughout the industry in Australia and internationally.

These best practice modules integrate environmental issues and community concerns through all phases of mining, from exploration through construction, operation and eventual closure. The concept of best practice is simply the best way of doing things.

The case studies included in these modules demonstrate how best practice can be applied in diverse environments across Australia, while allowing flexibility for specific sites. They achieve this by including practical techniques, recommendations, guidance and advice from Australia's leading mining practitioners.

I encourage mine managers and environmental officers to take up the challenge to lift performance in environment protection and resource management, and to apply the principles in these modules to their mines.



Barry Carbon

Executive Director,  
Environment Protection Agency,  
and Supervising Scientist

# EXECUTIVE SUMMARY

Many organisations in the mining, oil and gas industry are keen to promote an enduring environmental culture that can be demonstrated by positive environmental performance. Environmental awareness training for management and staff is essential for establishing this culture and undertaking development which is environmentally sound.

This module stresses the benefits of undertaking such a training program to avoid environmental incidents, and highlighting the need for executives who, in the event of such an incident, may be required to prove not only the existence of a comprehensive program, but also to prove the program's effectiveness.

There is no prescriptive cure-all that can be applied to all situations or all organisations in this field, because each of them has different organisational values and goals. Consequently this module does not contain 'how to' recipes for environmental awareness. Rather it identifies the underlying principles and factors that are critical to a successful training program. Managers can use these principles to plan a workforce environmental awareness training program appropriate to their organisation's culture.

To help managers remember the seven principles of effective environmental awareness training, a memory aid, 'CULTURE' has been used referring to the principles as:

- Communication;
- Urge;
- Leadership;
- Teamwork;
- Understanding;
- Recognition;
- Empowerment.

Case studies provided from some of the best practitioners in the Australian industry illustrate these principles in current practice.

Key aspects for planning environmental awareness training include:

- identifying and defining factors critical to a program's success;
- measuring and assessing aspects of performance;
- assessing overall program efficiency; and
- encouraging benchmarking with similar organisations.

Depending on the organisation's resources, the manager can usefully conduct:

- a quantitative survey of all similar mining organisations;
- a qualitative survey, eg using focus groups; or
- management interviews.

In this way the manager can:

- identify areas of best practice in particular sections or units within the organisation, which can then be applied universally;
- understand the organisation's culture and determine the factors critical to future success of the program;
- report to management on how current practices reflect the organisation's values, and deliver its stated environmental policy;
- identify environmental awareness training support needs and expectations;
- raise awareness in the organisation of environmental issues;
- establish an internal benchmark to measure progress over time; and
- identify those environmental practices the organisation is seeking in benchmarking partners who are considered to be leading practitioners.

Senior management can then be sure that the organisation is exposed to current best practice environmental management in mining.

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# INTRODUCTION

## A I M

DEVELOPING

AN EFFECTIVE

WORKFORCE

ENVIRONMENTAL

AWARENESS

TRAINING

PROGRAM

REQUIRES SENIOR

MANAGEMENT

COMMITMENT

This module identifies and promotes the principles of best practice in planning workforce environmental awareness training in the mining and petroleum industry. With increasing community demands and established needs for enhanced environment protection, environmental awareness is a major workforce training issue for this industry. Such training should establish an enduring and improving environmental culture that is demonstrated by positive environmental performance.

Managers planning and delivering environmental awareness training can use the conceptual tools in this module to help them analyse their organisation's training and awareness needs, and to help them identify best practice. In this way such training will incorporate content appropriate to their particular organisation's culture. Accordingly this module is not a prescription for environmental awareness training. Rather it highlights areas managers should survey, measure and review in planning and developing effective training.

This training should build capacity in an organisation to minimise environmental risk from human error through eliminating:

- poor application of existing procedures and processes;
- poor management system design; and
- inadequate decision making and problem solving.

Training will also help to develop an organisation's capacity to respond to social expectations and to implement change.

Apart from helping to meet basic environmental objectives and minimising environmental risks, such training assures organisations and the public that there is organisational capacity to provide for future environmental challenges, and to deal with emergencies and the rigours of continuous improvement in environmental practice. *Such training is the main ingredient in validating any claims concerning an organisation/industry's ability to manage its environmental performance well.*

## B A C K G R O U N D

Because each organisation has a particular set of environmental values and goals, one approach will not suit all mining and petroleum organisations. Consequently this module identifies underlying principles and critical success factors underpinning effective environmental awareness training to help organisations compare the effectiveness of their training against that of comparable leading companies. This process is known as benchmarking.

Spendolini<sup>1</sup> defines benchmarking as:

'a continuous, systematic process for evaluating the products, services and work processes of organizations that are recognised as representing best practices for the purpose of organisational improvement.'

This module focuses on environmental awareness training within the context of the Australian mining and petroleum industry. It acknowledges that, in achieving the best possible environmental performance, the individuals who make up the mining workforce play a critically important role. The benchmarking tools included here are generic and thus can be applied to other industry sectors.

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1 Spendolini M J 1992

## BENEFITS

Developing an effective workforce environmental awareness training program requires senior management commitment.

Key benefits of a program include:

- ownership of and commitment to environmental management at all levels of the workforce;
- a sustained, measurable improvement in environmental performance in both the individual and business unit level; and
- an improved capacity to manage future environmental issues and to minimise environmental risk.

Other benefits to organisations adopting and implementing such a program include:

- management and employee understanding of how specific activities impact on the environment;
- the development of management and employee skills resulting in cost-effective environmental solutions;

- focussing management attention and action on the areas of greatest environmental impact and risk;
- highlighting areas for potential cost saving strategies;
- presenting a responsible image to employees and the community; and
- minimising the potential for an environmental incident.

## CONSTRAINTS

The environment is but one area of change for organisations. There are many hurdles to be overcome including:

- communicating demonstrated top level commitment;
- resistance to doing things in a new way;
- unclear or poor communication of purpose and plans for change;
- incomplete application through lack of management agreement on training strategy.

## SCOPE

Managers, defined as anyone with a supervising role, are responsible for developing and maintaining workforce environmental training and awareness, and are therefore the focus of this module. This relates especially to executives and 'line managers', not just environmental managers. The module is designed to support managers by:

- describing the principles of environmental awareness training;
- identifying common pitfalls to avoid;
- describing best practice; and
- using case studies to show how industry leaders have overcome obstacles to success.

Related subject areas, *Environmental Management Systems* and *Community Consultation and Involvement* are covered in companion modules. Also this module does not cover organisational environmental objective setting.

'CULTURE'  
CONVENIENTLY  
SUMS UP THE  
FACT THAT

The content of an environment awareness training program will come from many sources. An organisation's specific training needs can be identified through survey and from the implementation of the organisation's Environmental Management System.

MUCH  
ENVIRONMENTAL  
TRAINING  
AND AWARENESS  
IS ABOUT  
CULTURAL  
CHANGE

CONTEXT

Environmental training and awareness in Australian mining continues to develop. Not surprisingly large, well resourced organisations feature as leaders in such training.

The larger Australian mining and petroleum organisations are often seen to be in the forefront because of the early response of the industry to its environmental challenges. However, even these organisations acknowledge the need for further improvement.

Organisations considered to exemplify best practice share these attributes:

- an environmental ethos where environmental excellence and business excellence are twin goals;
- a continual urge to improve their environmental management systems and performance, including training and awareness;
- senior management leadership;
- people working together sharing a common goal;

- a clear understanding of their environmental impacts and responsibilities;
- recognition of employee environmental initiatives; and
- a positive attitude where the environment is seen as providing an opportunity not a threat.

Many variables influence the timing and content of an environmental awareness training program. The program is a changing management tool designed to help establish an enduring environmental culture.

To effect cultural change the program should:

- align people and their values with the organisation's environmental vision and mission;
- be receptive to the ideas and perspectives of key interest groups in the community;
- ensure change is desirable and manageable;
- deliver measurable outcomes, providing feedback on progress;
- complement other management systems of the organisation; and
- ensure people have the necessary knowledge, skills and resources.

Key aspects for planning environmental awareness training include:

- identifying and defining factors critical to a program's success;
- measuring and assessing aspects of performance;
- assessing overall program efficiency;
- encouraging benchmarking against 'like' organisations;
- developing a memory aid.

While a memory aid can appear contrived, it can help to provide a key word that is easily remembered. 'CULTURE' conveniently sums up the fact that much environmental training and awareness is about cultural change. Its letters can be used to summarise the key principles.

These seven key principles to achieving effective environmental training and awareness are:

- Communication;
- Urge;
- Leadership;
- Teamwork;
- Understanding;
- Recognition; and
- Empowerment.

These principles should not be seen as separate, but rather overlapping and influencing one another.

Each of them is defined, and its attributes and potential pitfalls are described. Also described are factors critical in applying each principle successfully. These factors provide a benchmarking tool to compare existing performance against proven high performers, resulting in environmental improvement. These success factors are suggested as key areas where performance can be compared between organisations.

To judge current performance, a range of examples from 'common' to 'best practice' is used.

Managers rely on performance measures to determine program effectiveness. It is important to ensure that they do not misinterpret the information. In addition to quantitative measures to assess knowledge and



skills, independent evaluations are necessary now and again to measure changes in perceptions, understanding and attitudes over time.

To demonstrate how best practice is evolving and being continuously improved, case studies showing how leading Australian mining companies have addressed their challenges are provided.





Effective environmental communication increases management and employee understanding of organisational and personal environmental impacts. It also enhances skills development and provides feedback on environmental performance.

How do employees like to receive information? A survey by the Department of Employment and Industrial Relations found that 90% of Australian employees preferred receiving information about their immediate work area verbally, 9% through print and 0.5% through video.<sup>2</sup> Similar studies support this finding, identifying supervisors as the preferred source of important information.

In many organisations, sites/business units operate virtually autonomously. Head office attempts to raise awareness are commonly seen as interventionist and may be resisted. A recent Environment Protection Agency study<sup>3</sup> identified the most effective means for an Australian government organisation to communicate the benefits of cleaner production to small to medium sized enterprises. The lessons learned can equally be applied to larger organisations.

The study found industry journals and newsletters are the most effective media for a government agency to communicate technical and environmental information to organisations.

The benefits of journals and newsletters are that they:

- have been prepared by like-minded people;
- are often written by credible authors; and
- provide industry specific information.

Product brochures and flyers also rated highly. Significantly the study found industry associations and professional associations to be the major source of technical and environmental information for small to medium enterprises.

Within mining and petroleum organisations there is the opportunity to convey environmental messages through:

- workplace committees and forums;
- 'toolbox' meetings at the end of shifts, including safety training;
- induction programs;
- regular publications and leaflets;
- special promotions, eg calendars; and
- bulletin boards, billboards charting performance, eg achievements in resource conservation.

<sup>2</sup> Taylor DW 1982

<sup>3</sup> Coopers & Lybrand Consultants 1993

Pitfalls to avoid include:

- managers not explaining the reasoning behind a directive and failing to illustrate how it forms part of an overall strategy;
- information becoming unnecessarily complicated through providing more than required for the target audience to understand the situation;
- management failing to ensure relevant information is disseminated;
- information that is not credible or is misleading;
- setting unrealistic targets thus failing to achieve them;
- not providing back-up and support to achieve environmental goals, especially a lack of management attention to potentially conflicting demands; and
- managers losing credibility by not delivering promised initiatives.

**Table 1**  
COMMUNICATION – ANALYSIS AND BENCHMARKING

| SUCCESS FACTOR                   | PERFORMANCE RANGE  |  |   | PERFORMANCE MEASURE AREAS  |
|----------------------------------|--|--|---|--|
|                                  | COMMON   | GOOD   | BEST PRACTICE   |  |
| <b>Style</b>                     | Little effort to limit use of jargon/acronyms.                                 | Some effort to decode jargon and to limit acronyms.                        | Conscious limited use of jargon/acronyms. Glossary where necessary.   | Frequency of jargon/acronyms used.<br>Readability index.<br>Sentence length.                           |
|                                  | Not sensitive to local customs/taboo.  | Becoming sensitive to local customs/taboo.                                 | Sensitive to local customs/taboo.   | Effort to tailor information to local conditions.  |
| <b>Methods</b>                   | Single media. Messages lacking consistency and alignment to business strategy. | Tools developed to provide for each management level.                      | Face to face for important messages. Message consistent and aligned to business strategy.                         | Degree of line manager involvement in environmental training.  |
| <b>Use of local language mix</b> | Prescriptive approach not accommodating local language mix.                    | Corporate focus using corporate language, but sensitive to local language. | Conceptual focus mixing local/corporate language idioms. Use of local language.                                   | User perception/understanding.<br>Use of local language.<br>Evaluation of communication effectiveness. |
| <b>Frequency</b>                 | Few communications containing environmental information.                       | Ad hoc communication of environmental information from internal sources.   | Frequent communication of environmental issues and organisational initiatives from internal and external sources. | Frequency and mix of communication of environmental issues and organisational initiatives.             |

## EXXON Coal & Minerals Australia Limited (ECMAL)

Significant environmental and pollution control works have been established in recent years at the company's main operations (Ulan and Lemington Coal Mines and at Mt Thorley Coal Loader in NSW). However, it was recognised that the increased rehabilitation efforts and constructed engineering safeguards provided only part of the solution towards achieving the desired low level of environmental risks and high environmental performance.

To address the 'people factor' in environmental management in a structured way, ECMAL launched its Environmental Awareness Campaign in May 1992. The centrepiece of the campaign was the production of a series of 12 high quality posters and stickers covering all the key environmental management aspects of the operations. These included:

- environmental policy;
- environmental responsibility;
- fuels, oil and grease, land, air, water, groundwater, noise, topsoil;
- rehabilitation; and
- the future.

A presentation/training module on each topic was presented by the site Environmental Coordinator to each shift at each operating location (Open Cut, Underground, Workshop, Coal Preparation Plant and Administration). The posters and stickers were distributed to each employee after the bi-monthly presentations at the sites over a two year campaign. The use of quality poster and sticker materials as the adjunct to verbal presentations assisted the program's popularity and value. The program involved a gradual unfolding of the topics, generating employee interest with the elements of expectation and surprise. Both the posters and stickers link together to form a continuous panorama of minesite environmental issues. Flexibility in the program allowed for focussing on certain matters of particular relevance to the target audience, and for inclusion of information on current site and community affairs.

Employees were encouraged to discuss the relevance of the environmental issues to their daily activities and also to take the materials home to share and discuss with their families.

To complement the large group presentations by the site environmental specialist, a series of short instructional modules was prepared so that supervisors could continue the campaign by delivering 'toolbox' talk (short, informal meetings — while sitting on your toolbox) presentations to small work teams at the coal face. Also the environmental messages in the program were consolidated by the regular dissemination of site environmental happenings in internal weekly newsletters and monthly publications.

The impact of the Environmental Awareness Campaign has been positive and has provided the following outcomes:

- heightened awareness that has led to improved environmental performance, as measured by qualitative-based audits of the implementation of the Environmental Management System;
- a more cooperative attitude by all employees towards minimising environmental impacts and risks;
- a broader application of issues and risks at the minesite, enabling employees to incorporate environmental risk considerations into the various Risk Reviews undertaken by teams for new projects and major changes to operating procedures or equipment;
- an understanding of each person's responsibility for site environmental management during their day-to-day work, and how this relates to the total environmental performance of the company;
- a more constructive attitude by the workforce towards environmental management initiatives, such as inspection and reporting procedures;
- the structured campaign has provided a regular forum for feedback to raise issues of environmental concern and to suggest improvements; and
- raised corporate profile in the local community, with significant interest in the awareness campaign, and its posters and stickers, from schools and other organisations.



The urge or environmental motivation (willingness and desire) of the workforce is an intangible asset. To determine whether your organisation has the urge or environmental motivation, it is necessary to determine the receptiveness of management and employees to linking environmental performance with organisational success.

Some managers feel that technical training is all that is needed; that people will do the work they are paid to do. Training by itself achieves

nothing if the will is not there in the people who make up the workforce. This important point is best illustrated with an example. A few years ago, when consulting to an organisation undergoing significant change, the following exchange occurred in the operations room:

Q 'What would happen if a spill occurred?'

A 'The red light would flash here and I think another would flash in head office.'



- Q 'What would be the impact?'  
 A 'Contamination of a major waterway.'
- Q 'What has to be done to prevent a spill?'  
 A 'Turn the pump off.'
- Q 'Can you turn the pump off here?'  
 A 'Yes, by hitting this red button.'
- Q 'What would you do if the red light flashed now?'  
 A 'Let the damn thing blink, its not my job any more!'

How then might the need to motivate employees/managers be included with the need to train them? Kroehnert offers this view:  
 'A simple statement that should be applied to identify any performance problem is, "if a person's life depends on their performing a skill and they can do it, it's a management problem. If they can't do it, it's a training problem." Management problems can't always be solved by training and may need to be handed back to management to solve.'

**Table 2**

U R G E – ENVIRONMENTAL MOTIVATION OF THE WORKFORCE – ANALYSIS AND BENCHMARKING

| SUCCESS FACTOR                | PERFORMANCE RANGE  |   |  | PERFORMANCE MEASURE AREAS   |
|-------------------------------|--|---|--|---|
|                               | COMMON   | GOOD  | BEST PRACTICE  |   |
| <b>Employee receptiveness</b> | Employees deny or are angry that environment is an issue.  | Employees receptive to environmental initiatives.   | Employees introduce environmental initiatives.   | Number of environmental initiatives and ideas with employee volunteers.<br>Independent surveys.                                   |
| <b>Manager receptiveness</b>  | Managers deny their operations impact on the environment.<br>Few salary related environmental performance measures for managers. | Recognition of impacts and efforts to minimise major impacts.<br>Some salary related environmental performance measures for managers. | Recognition of impacts and attempts to use Environmental Management Systems.<br>Manager salary review includes environmental performance measures. | Presence of an Environmental Management System.<br>Number of environmental performance complaints.<br>Independent surveys/audits. |
| <b>Resources</b>              | Small % spent on Environmental Management System and training.   | Moderate % spent on Environmental Management System and training.   | Large % spent on Environmental Management System and training.   | Training and awareness budget as a % of expenditure.  |
| <b>Support</b>                | Generic training.  | Some specific environmental awareness training.   | Comprehensive environmental awareness training program.  | Environmental awareness training budget as a % of all training.   |

## CASE STUDY 2

Pitfalls to avoid include:

- recruiting managers/employees whose personal values are at odds with organisational values;
- not matching rhetoric with resources to achieve the environmental goals;
- failing to consider the influence on staff of family and local community needs;
- overloading staff with too many changes;
- not recognising or rewarding good performance (see Recognition); and
- sending wrong messages by indifferent action.

### Kidston mine

At Placer Pacific's Kidston Gold Mines Limited, located in central Queensland, senior management was struck by the poor visual amenity of the site. In an effort to improve the site's image, management approached the operators to ask what could be done. The result was surprising.

The site operators set out to improve their areas by planting trees. Management provided the financial resources, the employees supplied the labour. Once these areas began to improve, there was a noticeable change in attitude; people were becoming proud of their achievements. Elaborate tree irrigation systems began to be installed — supplied by the company and installed by the workers. People began to stay over on weekends to ensure that the watering programs were maintained, and would purchase their own equipment because they were impatient for change. Soon groups were competing to have the most improved area. They became focal points for work social gatherings. Areas were renamed with grandiose titles, for example the 'Pit Golf Club'.