

Is the Water Board Worth Preserving - A Management Perspective

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SUMMARY: The paper identifies several benefits for managing an organisation, from preserving and recording its engineering heritage. Justification for expenditure on conserving identified heritage values is provided.

1.0 INTRODUCTION

Heritage has been described as "the engineer's nightmare" (Whitmore 1986). Preserving and recording an organisation's engineering heritage takes time and costs money. Identified values and collated information, are often seen as generating constraints on day-to-day decision making. Often a system in daily use, must be kept operating while preserving its heritage values.

Economic rationalism requires heritage values to be identified, clearly articulated, and forcefully presented to decision makers. There is an urgent need for heritage protagonists to communicate to, argue with, and convince decision makers to preserve and record engineering heritage (Molesworth 1990). An organisation's management, needs to be conscious of community support for conservation of engineering heritage, legislative frameworks within which decisions are to be made, and values to themselves as managers.

Assets now in daily use by the Water Board (Sydney), date back to Sydney's first water supply (1788) and first sewerage systems (1854). The progenitor of the current organisation, was formed in 1880 as the Board of Water Supply and Sewerage. Sydney's Water Board is probably the largest organisation of its type in Australia, serving the nation's largest concentration of population, through provision of potable water, treatment of sewage and management of storm water. The system stretches across Australia's largest metropolitan area, processing water from precipitation to outfall, occupying 15,626 sq. Km. of catchment areas and 13,000 sq Km. of operating area.

This paper begins to catalogue benefits to an organisation, that are derived from preserving and recording its engineering heritage. Benefits are grouped under the headings of, statutory compliance, asset management, project management, staff management, income generation, public relations, and meeting external expectations.

2.0 STATUTORY COMPLIANCE

Heritage legislation impinging on the Water Board, operates at both Commonwealth and State levels. Although no Water Board assets have been classified under the World Heritage Properties Conservation Act (1975), several assets, such as Greystanes Aqueduct, Busby's Bore, and Centennial Park reservoir have been classified under the Australian Heritage Commission Act (1975).

At the state level, the NSW Environmental Planning and Assessment Act (1979), and the NSW Heritage Act (1977), are the principal pieces of state (heritage) legislation with which the organisation must comply.

Many Water Board sites such as Drummoyne Reservoir and SPS 271 Marrickville, are listed on Heritage Schedules in Local Environment Plans. Compliance with LEPs (through the EP&AA (1979)), is demonstrated through producing documents known locally as Reviews of Environmental Factors for most proposals, and Environmental Impact Statements for some. Documentation is required to contain sections on describing heritage items if relevant, identifying impacts on them, and measures proposed to mitigate impacts and safeguard identified values.

Both Busby's Bore and The Tank Stream, have had Permanent Conservation Orders placed on them, under the Heritage Act (1977). The Heritage Act (1977) requires compliance with Conservation Orders, and the keeping of a register. About 200 items are currently listed on the Water Board's, covering major industrial structures and ancillary sites.

At the departmental level, adoption of Staff Instruction No. 702 has established a framework for managing heritage matters. Specialist courses are run for staff working on heritage sites. Thematic surveys are being initiated, on topics such as moveable relics, Sewage Pumping Stations, Reservoirs, particular systems, vents, aqueducts, etc to identify their significance, and place individual items into context.

3.0 ASSET MANAGEMENT

Whitmore (1982) suggested that there are three elements of engineering heritage; 1. the engineers themselves; 2. the physical manifestations of their work; 3. the documents produced in evaluating design concepts and construction work.

Probably the greatest value of the engineers themselves, is that they comprise the organisation's intellectual property. Physical assets in daily use by the Water Board, include structures, sites and objects such as dams, canals, pipelines, reservoirs, pumping stations, associated depots, and offices. Documentary assets include, records of letters, photographs, reports, plans, records of rainfall, river flows, water quality, consumption, decision logic, problem solving, and organisational development, etc. Photographs taken during construction are particularly valuable, as they often show inside the now completed works. Photographs also indicate the surrounding landscape, social organisation, work practices, site management, and environmental impact. These assets have a range of values to the organisation.

3.1 Intellectual Property

In addition to the physical artefacts constructed to execute and operate the preferred solution, many problems are addressed and solutions tested during the investigate-design-construct-operate-decommission life cycle of any particular artefact. Engineering heritage, includes the multiplicity of undeveloped design solutions, concepts and guiding principles introduced during the work (Radcliffe 1985). This information is of considerable intellectual value to engineering knowledge. Intellectual property of an organisation, includes the accumulated store of professional knowledge that typically concerns learned societies. Some of the knowledge is collated in design codes, standard drawings, and construction handbooks, much is in the minds of the technically expert staff. Such knowledge is a store of possible alternative engineering solutions to most recurrent problems, and a starting point for unique ones.

The Water Board has specialist skills in project management of large public works for public health and water management. Skills that have been tested by experience. There are skills in the operation, maintenance, and development of a complex interdependent hydraulic system. Retirement of technical staff and an increasing rate of staff turnover, means a loss of detailed knowledge about the system's technicalities, quirks, idiosyncrasies, peculiarities, and the art of actually running the system. Much empirical knowledge is not written down. Current knowledge about the system has some surprising omissions, such as the location of many Section Valves. There is a desperate need to preserve the continuity of the knowledge. Complementing this point is the need to overcome a bias in formal engineering education towards theoretical

knowledge. Training in the practice of engineering must be made through experience, mostly gained in the workplace.

3.2 Physical Fabric

Engineering heritage is commonly perceived only in terms of the physical artefacts that have been constructed. The principle structural assets of the Water Board as at 1991 include; 26 dams and weirs, 445 service reservoirs, 300 water pumping stations, 19,600 Km of water mains, 19,100 Km of sewer mains, 1020 sewage pumping stations, and 35 sewage treatment works. Plus all the ancillary support infrastructure.

Much Water Board fabric is over 50 years old and of considerable heritage value to the Sydney community. However the organisation is regionalised, with much day-to-day responsibility delegated to local management. Preparing formal conservation plans, can guide proposed work, so preventing ad hoc decisions or personal taste from influencing the proposed works. Preserving physical items of heritage, provides permanent primary source material for historic research. Existing records are reinforced and historical errors can be corrected. Preserving and recording heritage values also provides the resource base on which to base accurate interpretation programs. Effectiveness of educational programs is considerably enhanced through use of real and authentic, three dimensional relics and sites, eg the Tank Stream.

Identifying engineering heritage early, reduces the risk that heritage matters may arise unexpected in managing assets under the organisation's care and control. Latent conditions are identified early, so can be anticipated and planned for.

3.3 Records

Trying to manage an asset without knowing the what, why, how big, when made, how made, made of what, where, condition of, how operated, operational problems, maintenance history, of the asset, is simply not sound management. Records provide a decision making data base, and include topics as basic as land owned, easements acquired, and location of services.

Records of past successes and failures can guide decisions, so avoiding the repetition of mistakes, eg lack of lining in the Pressure Tunnel when the City Tunnel was being designed, suggested that the later tunnel should be designed as a lined tunnel. Much of the organisation's heritage is found in operational and maintenance records. From these records likely future problems can be identified and maintenance programs designed, and budgeted. Process efficiencies can be calculated based on past performances, so enhancing public accountability. Records may also be used to establish the limits of existing process capabilities, and thereby support arguments for expenditure on additional works.

Pressures into hasty ad-hoc decision making, can be resisted if adequate records are available. Adequate records allow comparison of data, so allowing rigorous assessment of the significance of any particular item, and identification of truly significant items. Knee-jerk reactions are discouraged, personal biases are minimised, and the influence of particular pressure groups is limited.

Accumulated historic records, provide a baseline against which quality assurance of future works can be compared. Ensuring that a function can be repeated to an equivalent standard in the future, presupposes that records of similar past work are available. Adequate records are an essential component of any quality assurance program.

4.0 PROJECT MANAGEMENT

Sydney's wider society expects the Water Board's engineering heritage to be preserved and recorded. Identifying items of cultural significance prior to possible interference, alerts management to the possibility that the wider community may be concerned if the item is interfered with. Thus precautions can be taken to protect the identified value, so avoiding unnecessary criticism, or prepare a publicity campaign in anticipation of the expected. Proposals can be articulated on the sound base of rational decision making.

By identifying heritage issues at an early stage of project design, significant cost and time savings can be achieved. Special requirements for heritage considerations can be included in the project's budget and management plans. Flexibility is maximised, and the overall design time is shortened, by avoiding re-design of detailed works. Incorporating heritage concerns, avoids developing an adversarial system between polarised, threatened groups. By identifying environmental issues early in planning, there is less chance that the project will be delayed due to the discovery of latent heritage issues (Cairnes & McDougall 1991).

5.0 STAFF MANAGEMENT

Following the Second World War, the Water Board undertook the massive work of sewerage the metropolis of Sydney. Migrant labour was employed on large construction projects such as Warragamba Dam. The organisation was seen as a means of employing lowly skilled workers, mainly on construction projects. The organisational structure, and management styles were based on militaristic models. Over recent years the Water Board has had to change from being dominated by the construction ethic and managed by engineers, to an operating, managerial organisation.

Staff and ex-staff are likely to experience a sense of loss when structures or organisations with which they personally identify/ed are destroyed. Nervousness, insecurity and lack of commitment are direct symptoms of workers whose working environment has been stripped of all sense

of stability. Perceiving of history and environment as heritage, may help to combat worker alienation (Feilden 1988).

To an organisation undergoing rapid change in direction, development of an esprit de corps can be a valuable means of maintaining staff morale and unity of purpose. Feeling good about working for an organisation with a long history of successfully serving the public, is likely to engender a good feeling about continuing to serve. Interpreted heritage, can provide a knowledge about what the organisation has been good at doing in the past. Liking to associate with success, people are more likely to strive hard into the future, if they are aware of the organisation's successes in the past. Thus, preserving an organisation's engineering heritage, may be an important strategy in managing change in a rapidly changing organisation.

Heritage is an essential element in an organisation's self-identity, and also that of its workers. Cultural identity in time and space, is in part created by structures of the physical environment. Relics and sites consolidate cultural identity, both to society at large, and individuals within smaller social groupings such as particular organisations, and even work teams. However, recall of a worker's past life (both pleasant and unpleasant), is prevented by destroying the organisation's physical fabric. Amnesia suffered by an individual worker, may be translated into social amnesia, by massive re-organisation and physical clearance (Hareven & Langenbach 1981).

Staff have a psychological need to maintain stable landmarks in a rapidly changing world of continual change and organisational reorganisations. The need for a sense of roots is important to society as a whole, because it is an important psychological stabiliser to individual people, who in turn construct the larger aggregation. Understanding the "big picture" helps a person feel more secure, they become aware of life's continuity, by being reminded of links between the present circumstances and the historic past. A modern worker's concept of "progress", is developed by comparison with past working methods, equipment used, and particularly in occupational health and safety practices.

Workers are likely to feel good about working for an organisation, that displays a reverence for the works of its employees. Demonstrating a degree of social/environmental responsibility to the wider community (of which the workers are a part), encourages workers to care about their work.

The personal desire of the organisation's staff to maintain links with past engineering technology, is commonly evidenced. Old valves, lengths of wood-stave water main, and pieces of superseded construction plant, decorate the approach to many depots. Many more are carefully cosseted round the back of the depot, to keep them hidden from voracious managers.

Mounted photographs of past construction sites, are commonly found on the walls of in-service training centres. The Historical Research Unit is overwhelmed by material donated by staff cleaning out their working spaces, but wishing to see the material not lost. These self initiated expressive behaviours, signify a deep need for staff to retain a sense of continuity with the organisation's history, and for its heritage to be passed on to future generations.

Staff new to an organisation, are likely to feel more secure if the organisation has an apparent longevity. A sense of permanence can be created through accumulation of minor old assets, used to decorate the working environment. New managers need to appreciate that, physical settings may have very different meanings to older workers.

The Water Board's commitment to heritage preservation, has provided a source of stability and reminded its staff of the organisation's traditions of excellence.

6.0 INCOME GENERATION

There is considerable potential for consultancy work in water management, both in Australia and overseas. The intellectual property of the Water Board should place it in a competitive position to bid for such work, as has the Snowy Mountains Engineering Corporation.

Engineering heritage is a widely used resource for the tourist industry (Milner 1988), eg railway museums, mining sites, and dams. Most dams are significant tourist attractions, drawing heavily on the day-trip picnicker market.

During 1990-91 just over 2,398,000 visits were made to Water Board picnic areas (WB 1991, a). Guided tours are provided through the working areas of Warragamba Dam, the Tank Stream and several sewage treatment works. All are potential income earners. Direct income from recreation and tourism at Water Board dams, has risen from \$45,350 in 1987-88, through \$ 74,042 in 1989-90, to \$96,757 in 1990-91 (WB 1991, a). Much more could be raised if a fee was charged for use of the recreational facilities, as in State Recreation Areas.

Finding alternative yet sympathetic users for old pumping stations or treatment works is difficult. However, one old underground reservoir has been reused as a motor garage, and several ex-worker cottages are now leased for commercial return. Many terminal reservoirs are high in the landscape. Some are leased as platforms for elevating transmission towers and aeri-als.

Amassed data on river water quality is available from the laboratories at West Ryde. Gauging information can also be purchased.

Currently no charge is made to people using the Water Board's Historical Research Unit. A similar organisation (the State Rail Authority of NSW), charges \$5.00/annum for a research ticket to users of its archives.

Authentic researchers can purchase prints and slides from the Board's extensive and historic photographic collection, at normal retail processing prices. There is a sliding scale of fees for permission to publish material from the collection. Large, promotional, or commercial enquires are charged commercial rates. There is a market for the organisation's accumulated knowledge base.

7.0 PUBLIC RELATIONS

Tours over worksites, help to create a desirable public image. They give an apparently real insight into the problems facing the organisation, and the techniques being used to address issues, eg tours over the Malabar WPCP, or through Warragamba Dam. Tourists through the galleries of Warragamba Dam have increased from 27,840 in 1987-88, through 34,132 in 1988-89, to 41,055 in 1990-91 (WB 1991, a). Tours give members of the public and the organisation's own staff, an opportunity to see behind normally closed doors (MacCannel 1973), a peek into one of Goffman's (1959) "back regions".

Application of the Water Board's heritage policy, has created good public relations between the Board, the National Trust, community groups, and other government bodies. Developing an environmentally responsible image and displaying social responsibility are good public relations, especially as there is a strong correlation between the articulate, politically aware, upper middle class and interest in heritage issues (Tavistock 1980). The Board has received some good publicity over its initiatives in heritage conservation. Sound heritage management is a way to encourage support from influential members of the public.

In enhancing the quality of life of each individual consumer of the organisation's heritage, society as a whole benefits through an apparent enhanced stability and security.

8.0 MEETING EXTERNAL EXPECTATIONS

Arguably governments and engineers no longer lead, they follow. They follow the expectations, perceived concerns, and demands of other professionals and the public.

Water Board records are a resource base drawn upon by the wider society, in meeting their needs for information. Information may comprise technical or professional data about a system, such as river flow characteristics at a particular point, or what water quality can be guaranteed to be supplied. Schools and Universities use the physical assets and sites as outdoor classrooms and real examples for teaching students.

From the history of developing the organisation's assets, seemingly isolated relics can be placed into their proper context. Contexts might include technical, social, cultural, organisational, or procedural. By understanding the process w

will gain a greater understanding of its artefacts and sites (Temple 1985). Only by understanding the total process, can its components be meaningfully analysed. One value of the Water Board's heritage is that it is of a complete system, a complete process is available for study, and to provide provenance.

The Water Board's Historical Research Unit, provides staff and the public with a resource they can readily access in researching relevant interests. Public inquiries come from both professional and amateur historians. Common interests include people who have previously worked for the organisation, or the development of Sydney's water, sewerage and storm water systems. Engineering and health students often inquire about the history of the development in water treatment technology. Development of these systems has been a prime influence on the pattern of development of the entire urban area, which is of interest to urban historians. Inquiries at the unit have risen from 182 in 1985-86, through 750 in 1987-88, 1247 in 1989-90 (WB 1991), to an estimated 1567 in 1991-92 (WB 1991, b).

The Water Board's industrial heritage, differs from most cultural heritage in that it is owned and administered by a public authority (Birmingham 1983). The Water Board's heritage is public heritage, that staff within the organisation happen to manage on the public's (yours and my), behalf. Being publicly funded, the organisation has a duty to further the public good. There is a reasonable expectation, that what is deemed significant for the public good, should be funded from the public purse.

Public sector organisations, do not necessarily need to follow the model of an individual, corporate, trading organisation. Public sector organisations exist for different reasons, and serve different roles than do private ones. The Water Board, is there to serve the public interest, ie the public good, not just to further the financial betterment of its owners. Private shareholder value is defined solely in financial terms, whereas public shareholder value is defined more widely. Public sector organisations, support the public's lifestyle, which includes much more than just financial wealth.

Preserving and recording its engineering heritage, demonstrates the organisation's commitment to environmental and social responsibility, as a responsible corporate citizen. It also confirms the (engineering) manager's, moral and ethical commitment to enhancing the welfare of people (Nelson 1983).

8.0 CONCLUSION

Preserving and recording engineering heritage, has value both to workers within an organisation, and to the wider society.

However, an individual organisation does not exist in isolation from the wider society it serves, nor culture in which it operates. Identifiable benefits accrue to an organisation itself, from preserving and recording its engineering heritage.

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