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COMMUNAL ABLUTIONS FACILITY FOR ABORIGINAL OUTSTATIONS

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Small communities will often need alternative systems of water supply, sanitation, washing and wastewater disposal facilities. Numerous agencies supply various models of ablutions facilities. The Remote Area Hygiene Facility comprises laundry, shower, toilet, wastewater disposal trench, solar water heater, chipheater, hand-operated washing machine and washing line. The toilet is a water-seal, low water demand, pit type. A plastic, solar water heater has been developed to overcome the problems experienced by commercial, metallic units such as blockages, breakages and ruptures due to freezing. The plastic design is more durable in the chosen environment and quite easy to assemble. Wastewater disposal is by evapotranspiration which is shown to be more effective than leach drains in tight, clay soils and promotes the growth of trees and shrubs. The Remote Area Developments Group proposes the installation of these units as community-based training projects to provide general construction skills, environmental hygiene education and a commitment to maintenance.

INTRODUCTION

Attention to environmental health and the development of hygiene technologies appropriate to Aboriginal lifestyles is still necessary in many remote communities. While the call for European-style housing and facilities may often come from Aboriginal people themselves this technology is rarely accompanied by education and training nor backed up with maintenance. Sometimes it appears that modern European facilities are supplied to conveniently meet conventional building regulations or as a blanket solution to health problems. With wide improvements in medical services and community infrastructure there has not always been an associated transfer of technological understanding to Aboriginal people to enable themselves to create the environmental hygiene necessary for good health.

Certainly officially commissioned advice to government has recognised the need for 'appropriate technology'. The Blanchard Inquiry recommended that: *"increased assistance be provided to organisations concerned with the development of appropriate technology for remote Aboriginal communities, and the extension of this technology into the communities"* (House of Representatives Standing Committee on Aboriginal Affairs, 1987). Several organisations have been active in this arena in Australia to date including the Pitjantjatajara Council, the Centre for Appropriate Technology (CAT) and Eco-Tech (Foran and Walker, 1986; Mathew and Lantzke, 1988). Such developments should also aim to support reinforcement of cultural heritage, attainment of political autonomy and self-determination. It should be noted, however, that technologies and education for environmental hygiene improvement are only a small component of the challenge that Aboriginal people are facing to overcome broader social and political problems that confront them.

This paper proposes the design and construction of communal ablutions facilities in the context of community-based training programmes. The programmes would be useful for introducing a broad range of basic technical trade skills, practical environmental health education, environmental hygiene hardware and a commitment to maintenance. The aquisition of these skills are, in instances, essential for ongoing community development and self-determination.

HEALTH CONDITIONS IN REMOTE ABORIGINAL COMMUNITIES

There still exists in Australia a very wide margin between the standard of health of Aboriginal people, particularly in remote communities, and other Australians. While there have been major

improvements in health care over the last twenty years the extent of ill-health related to malnutrition and poor environmental hygiene is high and the increase in lifestyle diseases is alarming (Gracey, 1986; Gracey and Spargo 1987; Hollows, 1986; Thomson, 1984). The lifestyle diseases comprise obesity, diabetes, sexually transmitted and hypertension and are accompanied by alcoholism, substance abuse, vehicle accidents, etc. They have become widespread over the last twenty years due to the dramatic changes wrought upon Aboriginal society. There will continue to be major socio-economic changes in coming years as tourist and industrial developments intensify.

Recent studies in the Kimberley region of Western Australia reveal *"widespread mild to moderate malnutrition... amongst children"* (Gracey *et al.*, 1989). Poor hygiene results in the high prevalence of many infectious diseases in Aboriginal communities throughout Australia. Diarrhoeal and respiratory diseases are the major cause of morbidity amongst Aboriginal children and contribute strongly to the malnutrition experienced in the first three years. They are responsible for the highest rates of presentation to Central Australian clinics and hospitalisation in Alice Springs (Nganampa Health Council *et al.*, 1987). Pnuemonia occurs eighty times more amongst Aboriginal children in Central Australia than other Australians. Skin infections are the most common problems amongst Aboriginal children while trachoma is endemic amongst two-thirds of the Aboriginal population in Central Australia and more than three-quarters in the Kimberley. Anaemia, intestinal parasites and bacterial pathogens are common ailments amongst Aboriginal children (Gracey *et al.*, 1989). Kidney disease amongst adults is often the result of extensive skin infections.

Often the move to outstation life results in improved health from reduced stress, nutritious bush foods and increased self-esteem. However, the semi-sedentary nature of the community coupled with inadequately installed or maintained water and sanitation facilities results in low environmental health standards.

Broadly put, the problems of ill-health can be rectified through better standards of living, hygiene and nutrition, improved water supplies and sewage disposal and more appropriate individual and community hygiene practices. It is the latter coupled with appropriate technologies that will be critical for the success of any health improvement programmes. By providing Aboriginal health workers with the necessary skills they can then transfer these to their own community enabling wider participation in correct use and maintenance of facilities for improved hygiene. Pundulmurra Aboriginal College (Port Hedland, WA) has found in conducting environmental health worker training programmes that the problems are compounded by inappropriate dwelling design, inadequate consultation with communities to identify and meet their needs for facilities and services, lack of coordination between the agencies providing services and facilities and inadequate monitoring of legislative requirements for dwelling and living standards.

Environmental health management skills will need to be introduced in a climate where Aboriginals have self-esteem, control and empowerment. This has at times been expressed with no uncertainty... *"unless Aboriginals develop the ideologies and build group structures that will enable them to work together to change their lifestyle, health and hygiene they are destined to die out"* (Hollows, 1986). This should be read as referring to cultural identity. Aboriginal culture has survived European invasion and domination for two hundred years and will continue to survive for a considerable time. Although, it can be argued that with the increasing use of modern amenities and information systems significant Westernisation is inevitable. It is against this scenario that Aboriginal intellectual and cultural assertion is vital and technologies appropriate to lifestyle and environment in remote areas has a role to play.

PROVISION OF ESSENTIAL SERVICES

The application of 'appropriate technology' to Aboriginal development in Australia is but a mere fragment of the overall development effort carried out. For Aboriginal people who seek Western/European lifestyles and amenities this is not a problem. However, an alternative agent of development can usefully serve those who have turned their back on modern Australia to fulfill a viable lifestyle in remote areas where tradition is compromised by inadequate land rights and dependency phenomena.

Several factors have already been identified that lead to the poor health conditions experienced in Aboriginal communities today. These conditions have also arisen from Local Government authorities neglecting to provide adequate municipal services, particularly garbage collection, garden services, sanitation facilities, road construction, etc.; lack of expenditure on capital infrastructure by the State Government; lack of coordination between Commonwealth, State and Local authorities and failure to allocate resources for subsequent maintenance or upgrading of facilities (Davis, 1990).

Aboriginal society has been observed to resemble a "classic consumer society". Such social manifestations have facilitated the adoption ot technologies such as electrical appliances (televisions, videos, refrigerators, cookers, etc.) by a market-oriented 'straight transfer' approach. However, although there has been adoption of these technologies it has not been without significant structural social change to traditional cultural aspects of Aboriginal Society. In white society acceptance of these appliances occurs on a materialistic, possessive basis. In Aboriginal society their adoption gives prestige within the community by displaying the skills and knowledge necessary in their use (Chandra *et al.*, 1987).

Although it was observed in the above report that greater acceptance of an appliance occurred where there was improvement to family living conditions without changes to cultural values, this change has nonetheless occurred. Material possessions are traditionally shared. The purchase of a television/video, vehicle on hire-purchase or a refrigerator/freezer by a family meant their intensified use by the wider community could lead to social tensions. Discussions led to modications to traditional obligations and allowance of individual family ownership. Family housing had possibly already commenced this trend towards nuclearisation.

Three different approaches for technology transfer in Aboriginal development can be identified as the bureaucrat (e.g. Aboriginal Development Corporation - formerly), the technologist (e.g. CAT) and the facilitator (e.g. Pitjantjatjara Council) (Miles *et al.*, 1986). The first is concerned with developing more efficient bureaucratic channels for the diffusion of technologies. The second with a technology that can be accepted and operated by current values and resources and the third with facilitating consensus rather than democratic decision-making within the community on the appropriateness of a technology.

Walker (1986), explains that all development, education, housing, and other programmes have been based on the assumption that Aboriginal people will ultimately fully integrate into Australian culture. This is not the case and he describes three possible development scenarios that are likely to occur - (i) that Aboriginal people continue on their existing path but gain wealth from the mainstream economy through enterprises compatible with their lifestyle and value system; (ii) that they reject the linkage to the mainstream economy, values and technologies of white Australia and maintain a more independent, self-sufficient lifestyle with land-based values; and (iii) that they attempt variations of both these paths by living in remote isolated communities without enterprise development that does not degrade the land and continue the dependency on government funding. Although not postulating which will take place he calls on government and Aboriginal leadership to integrate their planning, which refers to the three appoaches above, and to challenge the people to identify their future so the that all may work collectively towards an appropriate and sustainable lifestyle.

The Remote Area Developments Group (RADG) slots into the role of the technologist and accordingly needs to take part in a holistic development strategy. The development of an appropriate ablutions facility while having to satisfy specific technical, economic and social requirements of the community must also harmonise with the broader developmental activities of government and Aboriginal organisations.

Australian Construction Services (ACS) (Commonwealth Government) offer an ablutions facility for Aboriginal communities. It comprises separate toilet and shower for men and women, a common laundry area in the middle and conventional solar water heating. The toilets are the aqua-privy type. The entire facility can typically be supplied and installed for $40,000.

Murrayriver North are building contractors based in Pinjarra, Western Australia who manufacture transportable ablutions facilities to ACS specifications. They offer the design described above or a single unit which can be doubled up to make the same male-female unit. These units are fabricated at Pinjarra south of Perth, put on a truck, complete with concrete slab, and transported as far away as the Kimberley, the Eastern Goldfields and the Northern Terrritory. On-site the contractors can dig trenches for the sewerage system and install the ablutions facility in 24 hours and be off.

CAT will supply the Appropriate Technology Ablutions Facility (ATAF) comprising shower, laundry, concrete base and chipheater for approximately $2,500. The Ventilated Improved Pit (VIP) toilet will be supplied for about $1,300. Installing both these facilities in a remote community will result in a total cost of approximately $9,000. These have both proven to be highly acceptable and function satisfactorily in remote Aboriginal communities. They are prefabricated at the Alice Springs Centre by Aboriginal trainees or employees in the workshop and installed on-site with community involvement.

Eco-Tech in South Australia have developed a trailer-mounted shower and washing facility in collaboration with the Oak Valley Community on the Maralinga lands to compliment their mobile lifestyle between outcamps. Many other contractors offer design and construction of ablutions facilities including Nomadic Enterprises of Tanunda, SA and Waringarri Constructions of Kununurra, WA.

DESIGN OF THE REMOTE AREA HYGIENE FACILITY

RADG has designed and built an ablutions facility for small Aboriginal communities or outcamps. The unit has been named the Remote Area Hygiene Facility (RAHF) and essentially comprises a laundry, toilet and shower. Several of the group's appropriate technology prototypes will be integrated into the facility: the solar water heater, the evapotranspiration trench, and the the pour-flush toilet. The facility also contains equipment developed by the CAT in Alice Springs, namely the chipheater and the hand-operated washing machine. The RAHF would cost approximately $15,000 to install in a remote community while local involvement in construction would reduce this cost considerably. Participation of the community is preferred in deciding on the appropriate design of ablutions facilities, planning, construction and maintenance. The RAHF is a new, low-cost option for remote communities that are seeking ablutions facilities.

The design is based on the ATAF manufactured by CAT. A fundamental difference is that the toilet can now form part of the facility whereas CAT has always provided the VIP toilet separate to the ATAF. The toilet can be separated though if the community finds the idea objectionable. It is a low-water demand, water-seal, pour-flush type.

The pour-flush toilet is still a pit-type but uses a lower volume of water by having a tap and bucket instead of a cistern - which is highly liable to breakage or failure. It needs about 2 litres of water while a cistern uses about 10 litres. Problems of offensive odours emanating from the toilet in close proximity to laundry and shower areas are overcome by using a water-seal toilet. The pedestal and base are concrete mouldings. The design is based on one used in Fiji. The seat is a white, durable, polyethylene moulding similar in appearance to conventional ceramic pedestals with a U-bend. Spare plastic inserts can be provided or if treatment may be excessively destructive a stainless steel insert can be used. The pit should be offset at the rear of the RAHF with a removeable cover to allow pump-out if necessary. The toilet system can be readily converted to a modern, full flushing cistern type at a later stage if desired and if adequate water is available.

The concrete slab of the RAHF can be poured using either conventional wooden formwork or a C-purlin frame which includes all fittings for attachment of steel wall frames, toilet pedestal, spoon drain, etc.

Structurally, the building uses 50 x 50 mm square steel tube. The steel frames themselves are 2 metre x 2 metre modules allowing several variations of the layout and orientation. Modifications include the addition of the solar water heater on a redesigned roof and an evapotranspiration trench each

being developed by RADG. Plentiful, strong shelving made from gridmesh and a heavy duty washing line made from galvanised bore casing and steel rope have been added to the facility. These are being evaluated in conjunction with the RAHF and all combine satisfactorily in a final integrated development.

The layout is such that the facility can be installed in any direction on a north-south or east-west axis. This will suit the desires and constraints of different communities. The two roof sections are then installed so that the solar collectors will be facing north. The solar water heater itself is fully integrated into the roof rather than being elevated on a separate, often flimsy, structure.

The solar water heater is a plastic unit that overcomes problems of blockage, corrosion and rupture due to freezing (Anda, 1989). Its design, based on the thermosyphon effect, is simple enough to be assembled in a low-technology workshop. Its capacity is 300 litres and can also serve as a preheater to the chipheater. The chipheater can then be used for hot water in times of extreme cold or many people using the facility.

Waste water from the shower and laundry trough enters the evapotranspiration trench which comprises several layers of graded sand and gravel with shrubs and trees planted in it. Water is disposed of by transpiration through the trees and capillary action upwards and then evaporation from the surface. In tight, clay soils this mechanism is superior in performance to the conventional leach drain which relies on percolation (see paper by McGrath *et al.* in this publication). The evapotranspiration trench promotes the growth of shrubs and trees which would otherwise be difficult in many denuded communities with limited water supplies and attention to horticulture.

TRAINING PROGRAMME FOR CONSTRUCTION

CAT carried out a national study for the development of a curriculum outline based on the range of functions and technical skill needs of remote Aboriginal communities (Walker and Seemann, 1988). The outcome of the study included the following recommendations, that a technical training programme should provide:

** technical skills and knowledge required for choosing "good", appropriate and feasible designs in technology, and develop the skills necessary to arrange and/or follow up the purchase, replacement or repair of these technologies;*
** development of knowledge and skills for general domestic repair and maintenance work including garden and landscaping skills;*
** practical knowledge of a broader range of technological options which is more appropriate to the lifestyle, base skills and services available in the community;*
** practical design and appropriate health hardware, fabrication and repair skills relevant to technologies facilitating all functions performed in the community.*

Apart from CAT it seems that no other organisations in Australia offer Aboriginal people training in appropriate technology for environmental hygiene. RADG will embark on such a programme in Western Australia during 1990. Initially this will be through offering technical support to Pundulmurra College, Port Hedland and the Appropriate Technology Unit at Newman Campus of Hedland College.

One RAHF has been built at Murdoch University for display purposes and testing of the solar water heater. Government agencies were able to view the construction during a Workshop organised by RADG (Ho, 1989). As part of Pundulmurra College's Environmental Health Workers Training Programme RADG will install one facility there. The facility, during construction and display upon completion, will be used to demonstrate the relationships between appropriate technology and environmental hygiene. Similarly, a unit will be constructed at Newman. Once these have been completed similar one or two-day workshops will be held for the local Aboriginal communities. Essentially, in the early stages RADG will offer mobile technical support to communities and later a facility such as CAT may emerge .

Detailed technical drawings of the RAHF have been prepared for prefabrication of components either by subcontractors or in a workshop training situation such as at Pundulmurra College. Moulds have been fabricated to pour the concrete for the toilet pedestal and base and the drainbox to the evapotranspiration trench. Steel benches have been fabricated to serve as jigs in the cutting and welding of the steel frames for the RAHF.

Construction essentially involves a) prefabrication of the wall and roof frames; b) painting of frames; c) attachment of plumbing pipework to frame; d) digging of pits for toilet and ET trench; e) pouring of concrete slab, toilet pedestal and drainbox; f) laying of pipework and gravel for ET trench; g) erection of wall and roof frames; h) fitting of wall and roof cladding; i) installation of solar water heater, chipheater, toilet pedestal, plumbing fittings, etc. and j) connection of water supply.

The benefits to be gained from a community-based building programme could be described as follows:

TASKS:	BENEFITS:
1. Finalisation of design details	Design input by community representatives hence satisfying subtle requirements from the beginning.
2. Purchase of appropriate materials	Reduced cost, durability, readily available replacement parts.
3. Fabrication of RAHF components on site.	Training of community members and involvement in fabrication will mean understanding of function and technology transfer. Skills development in welding, plumbing, concrete, etc.
4. Installation and commissioning of prefabricated components on site	Training in concrete pouring and installation, satisfaction in their achievement, respect of property, correct maintenance, participation in future community development construction activities.

By involving the people from design through to installation of the RAHF the equipment will probably be used and maintained properly. Simultaneously the trainees will be shown how the facilities relate to overcoming environmental health problems. The successful utilisation of the RAHF will improve environmental hygiene conditions leading to an improvement in community health, although subsequent evaluation of trends in health will be necessary. As new outcamps are being established in the region the trained people can be engaged in the provision of facilities there. The opportunity would also arise for some individuals to be employed as environmental health workers.

Training will be on-site rather than moving people to an alien location where home-sickness and disinterest would result. Basic training in plumbing, welding, concrete pouring, building installation, etc. will provide an introduction to technical trades courses offered by TAFE at nearby Newman or Pundulmurra College and Hedland College at Port Hedland.

Members of RADG will live on-site during fabrication and installation thus having a fully-integrated lifestyle approach during the training. The educators will have the benefit of becoming closely in tune with the needs and aspirations of the people which will be particularly important for future training and development work.

CONCLUSIONS

Aboriginal people commenced the outstation movement some 20 years ago with the goal of achieving political autonomy, control of resources, access to land and an improvement in lifestyle. Health problems were prominent in many of these semi-sedentary, semi-traditional, remote communities typically arising from poor environmental hygiene. Initially, minimal essential services were offered to these new communities. More recently modern European facilities with high levels of technology have been deployed for housing, water supplies, sanitation, etc. There

has not always been a corresponding improvement in the environmental health of the community. RADG began investigating these issues in 1985 and is now well advanced in the development of a number technologies related to water supply, water treatment and waste disposal. Amongst these is the Remote Area Hygiene Facility which essentially comprises a laundry, toilet and shower. The facility includes unique technical developments of the group namely, the plastic solar water heater, the low-water demand, water seal, pour-flush toilet and the evapotranspiration wastewater disposal trench designed to overcome specific problems experienced in small, remote communities. RADG intends to embark on this environmental hygiene technology transfer through community-based training and construction programmes.

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