Engineers and nonviolent struggle

by Brian Martin*

It is well known that engineering can be used for military purposes. But it is also possible for engineers to use their skills to support nonviolent methods of struggle.

Some of the methods of nonviolent action are strikes, boycotts, rallies, leaflets, fasts, sit-ins and setting up alternative institutions. Gene Sharp in his classic book *The Politics of Nonviolent Action* lists 198 different types of nonviolent action, with historical examples for each. Many of these methods were used, for example, in the struggle of Indian independence led by Gandhi and in the United States civil rights movement. More recently, nonviolent action was crucial in toppling the repressive Philippines government in 1986 and thwarting the 1991 coup in the Soviet Union. In 1989, most of the Eastern European regimes collapsed due to lack of support; no armed struggle was required.

Contrary to many people's intuition, in many cases nonviolent methods are more effective than violence. Adherence to nonviolence is likely to win supporters, including soldiers on the other side. Nonviolence works by undermining the commitment of the aggressors and winning-over neutral third parties. The killing of unarmed protesters often generates worldwide outrage and concern, as in the case of the Sharpville massacre in South Africa in 1960, the 1989 Beijing massacre and the killings in Dili, East Timor in 1991.

In August 1968, Warsaw Pact troops invaded Czechoslovakia. There was no military resistance from either Czechoslovak forces or the West, but there was a spontaneous nonviolent resistance. Resisters were so effective in convincing Soviet soldiers that the invasion was a bad idea that Soviet commanders pulled-out many troops after only a few days, replacing them by ones who did not speak Russian. The Czechoslovak radio system was effective in supporting and mobilising the resistance. Although the resistance was eventually defeated, a puppet government was not established for eight months. Furthermore, the international credibility of the Soviet Union was severely damaged, especially among western communist parties.

Nonviolent methods were used, often with success, against the Nazis in several occupied countries during World War II. Nonviolent insurrection has been used to topple military dictatorships, as in Guatemala and El Salvador in 1944. These historical examples suggest the potential of nonviolent action. Of course, nonviolent action is not guaranteed to succeed, but neither is military force.

Beginning in the 1950s, a few people began proposing nonviolent struggle as an alternative to military defence. This is called nonviolent defence, social defence or civilian-based defence. The idea is that a society systematically organises itself for nonviolent resistance to aggression or repression. This has not happened anywhere in the world yet, so it is impossible to say how effective it might be. But it should not be dismissed out of hand. The amount of money, planning, training and research that has gone into military methods is enormous. If a similar investment were put into nonviolent defence, its effectiveness could be improved dramatically.

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Some of the things that might be done include:

- education in methods of nonviolent action
- practise using role-plays and simulations
- systematic learning of foreign languages, in order to communicate with people from potential aggressor states
- forging links with democratic opposition groups in other countries
- building of secure communication systems, especially network systems such as telephone, computer networks and shortwave radios, that cannot be easily captured.

Australia is in a privileged position in that the risk of military invasion is slight and a military coup is quite unlikely. This security means that there is great freedom for developing techniques for improving the capacity of nonviolent struggle, many of which are urgently needed in other countries, especially ones with repressive governments.

Scientists and engineers have an important role to play in improving the capacity of a society to use nonviolent action to resist aggression or repression. But until now, virtually nothing has been done to look at the possibilities. With support from the Australian Research Grants Scheme, Mary Cawte and I are studying how science and technology could be used to support nonviolent struggle. In our initial interviews with engineers at the University of Wollongong, we asked them to imagine a society in which most of the population was committed to nonviolent resistance to an aggressor. What could engineers do to enhance the capacity of the resistance? Here are some of the ideas that were raised.

Centralised technologies, such as large dams, integrated steelworks and large powerplants, could be the target of terrorists as well as aggressors intent on subjugating the population. Dams could be designed so that the water could be released quickly but safely. In a number of countries that are still developing their infrastructure, choosing microhydro rather than large dams would greatly aid resilience against attack. Another approach is using water tanks and dry toilets to reduce water requirements from a central supply system which might be destroyed by an aggressor.

Similarly, minimills provide greater resilience than integrated steelworks. Putting solar systems around the country would mean that the population could not be held hostage by control over electricity-generating plants. The challenge is to develop technologies that are maintenance-free and efficient. Of course, economic incentives are

important in promoting such alternatives.

Bridges are often attacked by aggressors. Building a bridge that would survive attack would be impossibly expensive. Designs allowing easy rebuilding would be possible. Also, bridges might be designed so that saboteurs could easily be detected. Laser detectors, perhaps?

Similar considerations apply to housing. To be able to reconstruct destroyed buildings, designs should be simple and straightforward, relying on readily available materials. Portable homes might be useful for moving people around the country. Apparently there is some research on cheap, effective housing for developing countries. Research could be done on materials to make tents long-lasting. Combined with telecommunications, tent-based activists would be hard to track down.

In the case of manufacturing, aggressors often take over plants for their own purposes. To resist, workers can go on strike, but torture against workers or their families could be used to break the strike. Another approach is to go slow and make "inadvertent" mistakes, as done in some factories taken over by the Nazis in World War II.

A technological solution is to design the factory so that vital pieces of equipment can be removed or destroyed. Replacements could be kept in a safe place, such as another country. Torture would be pointless, since it couldn't get the factory going again.

Actually, in many modern factories, the technological sophistication is so great that outsiders would not know whether the workers were resisting or not.

When hierarchies are flattened and groups of workers can operate without a boss, the workforce is better equipped to resist a takeover. Therefore, those manufacturing systems that are tied to empowering the workers may be the best for nonviolent struggle.

Communications would play a crucial role in any nonviolent struggle. Some possibilities are cheap and easy-to-use shortwave and packet radio, cassette tapes, computer networks in which master users are not vulnerable to intimidation, and secure encryption systems. A dense and redundant system of such technologies would make it difficult for an aggressor or usurper to cut off external communications such as happened in East Timor in 1975, Poland in 1981 and China in 1989.

Several of the people we interviewed emphasised that social, economic and political factors are central to nonviolent resistance. They are certainly correct. Nonviolent struggle requires widespread support. By contrast, a military regime needs loyalty only from relatively few. Psychological factors are crucial.

Nevertheless, technical skills and physical infrastructure have an important role to play in nonviolent resistance. A great deal more work needs to be done to determine what is possible and practicable. ❑

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Toward a risk-distributing society

The only thing we have to fear is fear itself – Franklin D Roosevelt (1st Inaugural, 1933)

MILLER'S TALES

BY DR PETER MILLER

Recently a friend sent me one of the new Wilkinson Sword disposable safety razors. In an extremely clever and beautifully executed development, a flip-up guard has been added to cover the blade when it is not in use. His question was, will the guard offer protection against a product liability suit?

I suspect it will not; nevertheless the excellent piece of design and execution added to this razor, which retails for 22 cents, must have been driven by just that concern, and should diminish the risk of injury.

My mind went back to my decision, when I first shaved in the 1930's, to buy a cutthroat razor. Gillette's safety had been around for some time, but it was clumsy compared with the hollowground elegance of the oldtimer and could not shave as close. I suppose there was a macho element at work as well. I demolished one leather strap learning to keep it sharp, but when I abandoned the razor in my early twenties, in deference to my wife's concerns, a second strap was still in good order. If I had kept the razor I am sure that I would still be using it, and it would also be a lethal weapon (but not the only one) in our house.

In the meantime I have thrown away a large quantity of stainless steel and plastic, although not as much as I would have if I used disposable razors.

I learned quickly with my cutthroat that the trick was not to be afraid of it. Recently I have been reading "Risk Society", in which German sociologist Ulrich Beck postulates that we are evolving from a wealth-distribution mode to a risk-distribution mode. He sees the evolution from feudalism to the industrial society as wealth-distributing, and the transit to risk-distribution natural, now that our needs are met and we are dealing with our demands.

"The driving force in the (wealth-distributing) society," Beck says, "can be summarised in the phrase 'I am hungry'. The movement set in motion by the risk society, on the other hand, is expressed in the statement: 'I am afraid'."

We certainly act as though we were afraid. Beck suggests that the political response at the moment is to establish systems with criteria which cannot be met, and when the criteria are not met to blame individuals rather than recognise system failure. Current attitudes to Occupational Health and Safety and to product liability are examples of this trend. Witness the guard on the disposable safety razor.

Miller's Tales is a regular column dealing with liability and indemnity topics. It is written by Dr Peter Miller, chairman of the IEAust's Standing Committee on Legal Liability and Professional Indemnity.