

Figure 7 (Right). Lower hemisphere Schmidt Net Plot.

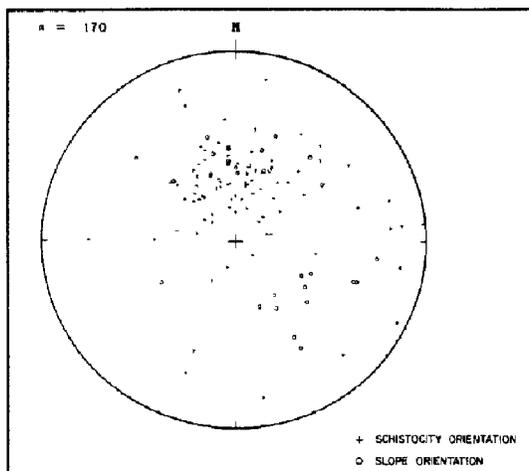
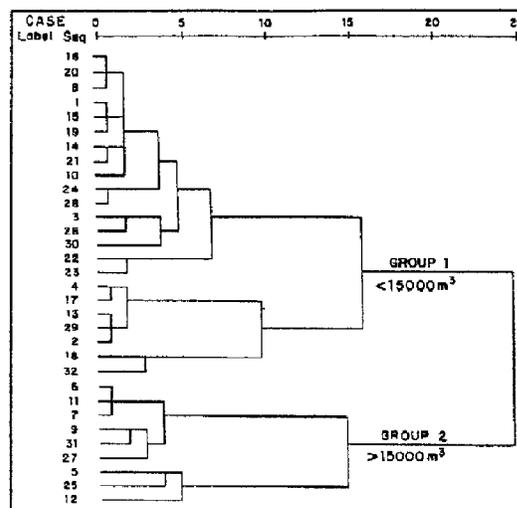


Figure 8 (Far Right). Cluster analysis dendrogram - landslide volumes.



Plots of slope angle versus slope height relationships for failed slopes indicate a wide variation in landslide failed slope height and slope angles (Figure 9). The maximum slope height and angle were 47 metres and 64° respectively. These values probably reflect the heterogeneity and competence of the rock material which in the field show variation from sandstones, to phyllites and schists to that of residual soil. The results however do not discriminate between the slide types, whether in residual soil or in deeper seated rock. What is noteworthy, however, is that the failed slopes were never less than 30° but the majority of slope failures were within the range 30° to 40°, probably representing slopes that were nearing equilibrium (Figure 10).

Slopes with angles greater than 40° were probably still potentially active owing to the existing range of slope angles deviating from the general angle of repose. A comparison of the calculated set back angles for these slopes within the range 30° to 40°, however, revealed a wide range of values also, probably related to the heterogeneity and competence of the rocks outcropping on the hillslope.

A correlation coefficient value of 0.9 was derived for the set back angle versus the failed slope height, with a linear regression equation of:

$$y = 6.82 + 0.45x$$

y = failed slope height and  
x = setback distance  
for predicting the failed slope height or, vice versa, the setback distance. The high correlation coefficient indicates that it is possible to predict the slope height based on any given set back distance required. These setback distance values can be used for zoning areas with regard to identifying a buffer zone from the road for specific development purposes (Figure 10).

### Considerations for Disaster Management

Landslide hazard assessment along the North Coast Road is a critical pre-planning phase within the framework of disaster management since the roadway renders communication to several communities spread within the range. Though landslide events are not usually episodic along the road, an understanding of the hazards allows for better planning for any size event, particularly after a major storm or hurricane.

Prediction of unstable areas and estimation of the probability of failure of different size landslides, based on various factors including slope height, is possible using the results from the landslide assessment. In the event of a climatic-related disaster, different scenarios for landslide volumes and associated clearing operations can be rated from a best case to worst case scenario. The result is that different resources (trucks of particular sizes, tractors, personnel) can be assigned to the NCR area. For instance, mainly five ton trucks are used in road clearing operations along the North Coast Road because of the limited manoeuvrability along the roadway (Figure 11).

Table 1 Classification Results

CLASSIFICATION RESULTS			
Actual Group	No. of Cases	Predicted Group Membership	
		1	2
Group 1	21	20	1
0 - 15000 cu.m		95.2%	4.8%
Group 2	11	0	11
15001 - 40000 cu.m		0%	100.0%
Percent of "grouped" cases correctly classified		98.88%	

Proper planning for landslide activity along the North Coast Road is critically needed in order to mitigate against the full effects of disaster events which result in extreme cost due to damage to road and other engineering structures. Along the road the approach to mitigation lies in the development of a proper understanding of cause and effect of landslides which can assist in zoning areas based on susceptibility to failure and the magnitude of potential failures. These kinds of data allow for the setting up of necessary decision-making mechanisms for such activities as road clearing operations during rescue, to be carried out timely and cost-effectively. Knowledge of the landslide types and failure mechanisms is important for the proper implementation of corrective mechanisms using cut-slope dimensions and possible roadway orientation of the engineered road cut to reduce the probability of failure.

Because of the residual soil slides and deeper-seated debris slides occur in areas affected by deforestation, the necessary decision-making process would involve the establishment of strict controls by way of regulations to ensure that slopes cut in unconsolidated rocks remain forested. Corrective actions are critical since the drainage systems in these areas appear to be delicately balanced. The high frequency of residual soil slides after heavy rainfall bears testimony to this fact.

### Conclusions

- (1) Landslide hazard assessment is a necessary prerequisite for disaster management planning along the North Coast Road in order to predict the severity of landslide hazards in that area
- (2) Geological investigations, coupled with statistical analysis on selected data, provide the necessary information to better characterise the landslide events.
- (3) Two main landslide size groups exist along the road and can be predicted to some extent using geological and slope characteristics, both for road clearing operations and for mitigation purposes.
- (4) Landslide hazard assessments can be used for determining safe setback on slopes for development designs along selected buffer zones on the routeway.

● The author would like to thank the following for assistance during the project: National Helicopter Services, formerly Air Wing Division, Ministry of National Security; Mapping and Control, Lands and Surveys Division; Water and Sewerage Authority. I would also like to thank those who assisted with field work, drafting and reading this manuscript.

### References

- 1 United Nations 1984 Disaster Prevention and Mitigation Vol. II. Preparedness Aspects Office of the United Nations Disaster Relief Co-ordinator, Geneva
- 2 Wharton, S. R. 1993 Landslide Hazard Analysis In Hilly Tropical Terrain – Trinidad and Tobago Caribbean Conference On Natural Hazards: Volcanoes, Earthquakes, Windstorms and Floods. Oct. 11-15, 1993 Trinidad and Tobago.
- 3 Wharton, S. R. 1990 Regional Evaluation of Cut-Slope Instability Using Statistical Methods – Northern Range, Trinidad, 2nd Geological Conference, Geological Society of Trinidad and Tobago Trinidad and Tobago
- 4 Kugler, H. 1959. Geologic Map and Sections of Trinidad. Printed by Orell Fussli Arts Graphiques S.A Zurich (Switzerland) 1961.



Figure 10 (Top) Residential structure at risk to landslide



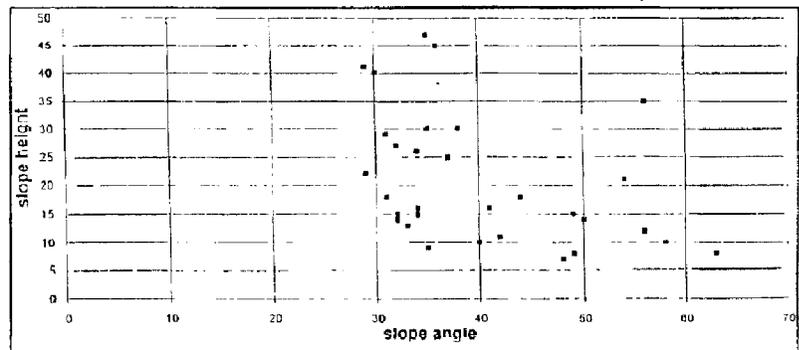
Figure 11 (Above): Truck size normally used for haulage of landslide material.

- 5 Wharton, S. R. 1988 Decision Analysis for Slope Stability Phenomenon Within Cut-slopes In the Island of Trinidad, West Indies 1st Central Canada Geological Conference. University of Western Ontario, Ontario, Canada.
- 6 Deere, D. C. and Patton, F. D. 1971. Slope Stability in Residual Soils. 4th Pan Amer. Conf Soil Mech Found. Eng. Puerto Rico. Vol 1

### Bibliography

- Hudec, P. P. and Wharton, S. R. 1993 Statistical Evaluation of Factors Contributing to Landslides in Road Cuts in the Northern Range of Trinidad Proceedings of the 7th International Conference and Field Workshop on Landslides in Czech and Slovak Republics Aug 28-Sept 15, 1993.

Figure 9 (Below): Slope angle versus slope height relationships



# Options For Change? Volunteer Reserves and Civil Disasters

by A. E. Hills\*

## Abstract

This article debates whether the UK volunteer reserve forces should be regarded as a resource for supporting the police in civil disasters. It is concluded that, although the reserves may have a role to play in any implementation of military aid to the civil community (MACC), it would be inappropriate to use them as an unarmed version of the US National Guard.

## Introduction

The role of military forces in the response to civil emergencies has been frequently addressed in recent years. In the aftermath of the Gulf War, for example, Operation Haven and Operation Provide Comfort marked the use of military forces in humanitarian relief forces on a scale not witnessed since the 1940s. The use of military forces to alleviate suffering caused by both man-made and natural disasters has led to attempts to re-evaluate the nature of military activity in international disaster relief, though the debate has centred on the humanitarian crises caused by wars.

There has been no comparable debate on the role of UK armed forces in assisting the civil authorities, through the military aid to the civil community (MACC) scheme, in any UK civil disaster such as that occasioned by severe weather. This absence is indicative of the fact that the role of the military as a source of scarce resources in such a situation is accepted as legitimate; military forces may be essentially technocrats of violence, but they are seen as servants for the common good in the circumstances of incidents such as Lockerbie or Towyn. There have, for example, been nearly 20 occasions on which the provisions of MACC have been invoked in the last seven years, ranging from the use of four SAR helicopters and RN diving teams during the sinking of the pleasure boat *Marchioness* in 1989, the 104 RAF personnel involved in firefighting in Malvern in 1990, to the use of sappers during the Chichester floods of January 1994.

## Volunteer Reserve Forces

Although the use of regular military forces in such circumstances is uncontroversial in the UK, the role of volunteer reserve forces may be less clear cut in the absence of public debate on the matter, particularly if the use of such forces is closely tied to that of the uniformed emergency services in general, and the police in particular. A recent article by Sandra Wilkinson,<sup>1</sup> for instance, has raised this issue by suggesting that UK volunteer reserves are an under-used resource for supporting the police when the latter deal with civil disasters and public order incidents, and that they should be used as an unarmed version of the US National Guard, providing support to the emergency services in such circumstances.

The precise role of the reserve forces in support of the emergency services was publicly raised by the series of disasters in the mid and late 1980s. In 1990, for example, an article by Roy Ingleton<sup>2</sup> argued that the Options for Change programme could create a perceived need for a part-time, volunteer national police-reserve, similar to the National Guard, because defence cuts might mean that the army would no longer be in a position to support the police in the event of acute public disorder. The article considered whether the Territorial Army (TA) could be used in a similar fashion, but decided it would be unacceptable in the UK. It did, however, suggest that defence cuts could lead to the adoption of a paramilitary police reserve similar to the French CRS; that is, a mobile reserve composed of self-contained units with their own chain of command and transport, which could supplement local police establishments when necessary, regardless of whether public order issues were involved or not.

Ms Wilkinson's article returns to the theme of the efficient use of volunteer forces and the police. Although she refers to volunteers acting in support of 'the emergency services' she does not, in fact, consider the role of reserve forces in support of the other three emergency services in the UK. However, consideration of the subject is not clear-cut, even with this limitation.

The title of the article, *Force for Peace?*, and the fact that the terms of reference of the author's Churchill fellowship were to see whether the National Guard could become a model for both UK police and reserve forces, and of whether war planning could be translated into peacetime planning, blurs several issues into one

---

Dr Alice E. Hills is a consultant at the Home Office Emergency Planning College. The opinions expressed in this article are those of the author alone and should not be regarded as representing those of the Home Office.

First, there is the issue of whether the role and functions of a paramilitary reserve, working to a state governor with a different system of government and political tradition, is translatable to the UK context. And, second, there is the fact that the distinctions between conditions of war and peace in the UK may be sharper than the 'all-hazards' approach to emergency management, originally adopted by the Home Office in the heyday of civil defence, acknowledged.

In the context of this article, it may be more profitable to concentrate on a further problem which centres on the use of reserve forces (such as the TA and the reserves of the Royal Navy, the Royal Marines and the RAF), which normally act in support of regular forces who may, in turn, be called upon to assist the police and emergency services in civil emergencies.

Consideration should be given to the issue of whether this would be acceptable or desirable. If it is, then a decision should be taken as to whether there should be a substantial investment in reservist training and equipment, so that reserve forces can participate in large-scale operational deployments in aid of the police in civil crises. For the sake of this argument, civil crises can be limited to disasters such as flooding and air crashes on the scale of those experienced in the late 1980s at Lockerbie and Kegworth. The use of the military, let alone reserve forces, in public order situations on the UK mainland deserves separate attention.

Even with this limitation, Sandra Wilkinson's article raises a number of topical issues warranting serious consideration.

### Local Response vs National Response

First is the matter of a local, as opposed to a national, response to any disaster. After the disasters of the late 1980s, the Home Secretary set up a review of existing arrangements in the UK. The decisions resulting from this review were announced in 1989, when it was made clear that the response to emergencies would remain at a local level and that there would be no national disaster squad along the lines canvassed at the time. Arrangements for mutual aid were effectively encouraged by the fact that a civil emergencies adviser was appointed to improve the co-ordination of the response and to ensure that lessons from past disasters were disseminated and learned. The adviser, a retired air vice marshal (David Brook), aided by his consultative group made up of senior representatives from the emergency services, launched a number of initiatives in pursuit of this remit.

He produced guidance notes in the form of the pamphlet *Dealing with Disaster*. This noted that the emergency services have well-developed mutual aid plans, but that local authorities, who would be expected to ensure a return to normality after the emergency services had dealt with the life-threatening aspects of any disaster, do not have such plans, and that they therefore would look to the military for support.

Given this emphasis on response being at the local level where resources may be limited, it is pertinent to ask, as Ms Wilkinson does, whether local volunteer reserve forces should be written in to civil emergency plans. The relevance of this to the current debate on essential police functions is clear when Wilkinson asks whether the reserve forces could perform many of the roles of the police in any civil emergency, leaving the latter free for their more specialist roles.

Ms Wilkinson examines the role of the National Guard in the response to Hurricane Andrew in Florida and the Los Angeles riots of 1993. Basing her argument on these examples, she concludes that the UK reserve forces can, and should, play a significant role in support of the police and other emergency services in civil emergencies: "The reserves would constitute up to a quarter of our country's defences in a national emergency, so why not put their undoubted qualities of discipline, leadership and self-reliance, and their not inconsiderable logistical support to use now?"

Why not? At first glance, this appears an attractive proposition. Such a role would enhance the TA's image and morale; it would make use of volunteers' local knowledge; and it would provide reserve forces with an important role at a time when other roles may be uncertain. In addition, such forces may also be able to provide an economical source of disciplined manpower in a time of emergency, as they undoubtedly did during the North Wales coastal flooding of 1990, when local TA units proved cheaper than the regular units which would have needed bussing in. In this context, it is possible to see the TA as an extension of military aid to the civil community. Indeed, it is probable that the initial request for any such aid after, for example, severe weather similar to that which struck the south east of England in 1987, would be made by the police or a local authority at a local level to a local headquarters. So why not write the reserve forces into plans now?

After all, since any form of military aid requested under these circumstances is needed quickly, the district or brigade headquarters would normally decide if a mix of regular and TA units would be needed (as they were at the Tayside floods of 1993). Any distinction between the use of regular or reservist troops would be seen as a matter for the Ministry of Defence, not the Home Office. The relevant JSP ruling, for example, makes no distinction between the two in this role. Provision made for this type of response does exist, but it is essentially and *ad hoc* arrangement, dependent upon the circumstances of the occasion. And, in practice, it is either short-lived or expensive.

### Who Pays?

The reserve forces are an important resource, but to suggest that they be formally incorporated into an automatic deployment at times of disaster would be impractical, even if the political will were there to support their use. In fact, the political, legislative and financial support necessary to ensure successful incorporation does not exist at present and is unlikely to do so in the immediate future. Central government may see volunteer forces as a way of supplementing the emergency services in certain circumstances, but the commercial and industrial world which employs most volunteers are, in practice, unlikely to subsidise it. There are practical time limits to the good-will on which such a scheme would rely.

The question of who pays is, in fact, the fundamental *practical* reason why the TA should not be formally used to supplement the police in the way Ms Wilkinson suggests. Who will be prepared to absorb the inevitable costs which cannot be included in 'training'? Some voluntary groups, such as the First Aid and Nursing Yeomanry (FANY), which supports the City of London police casualty bureaux, for example, may be in a position to pay their own costs. However, most would not be in such a position, or, if they were, would only be willing to do so for a limited time. And disasters are notorious for disregarding convenient time-tables.

Just because reserve forces are composed of volunteers does not mean they are free. Military aid to local authorities in the life-threatening stage of an emergency may be free, but after that it can be expensive. The Bailey bridges built by sappers at the time of the Chichester floods in 1994, cost the local authority £40,000 in January and £50,000 in February. Why should the TA be cheaper than regular soldiers or local contractors? If a lack of perceived authority is likely to be a major obstacle to the use of reserve forces in supporting the police, then money may be an important barrier to using reserves outside the context of MACC.

Ms Wilkinson suggests that although training and deployment costs for reserves would have to be spread over two government departments (the Home Office and the MoD), in the case of the police and the TA, "this should not be insurmountable given an element of goodwill." Unfortunately goodwill is a precious commodity. All government departments suspect new proposals which might cost them money. Once a task is recognised, it is usually followed by demands for extra training and equipment which require extra funding. Of course, government departments might be tempted to get cheap policing by using large numbers of reserves or specials, as has been suggested by correspondents in recent editions of *Police Review*,<sup>3</sup> but this does not solve the problem of who pays.

Even if the cost of reserve forces is low, the use of such forces, or the anticipation of their use, by local authorities might raise unrealistic expectations that more help would be available in an emergency. This could not be the case unless extra money were also available. And more money would indeed need to be available if the necessary essential training and exercising were to take place. It is difficult to conclude that the substantial investment required by proposals to use reserve forces in this way will take place.

Financial and practical considerations may, in fact, prove a greater obstacle to the use of volunteer forces in support of the police than legislative or ethical issues. It is possible that the Adam Smith Institute, for instance, may suggest that reserve forces would be an efficient instrument to supplement the police, thereby leaving the latter to concentrate on their core functions in a disaster response. That the unthinkable can become thinkable in a short space of time may be illustrated by the fact that, as recently as July 1987, Douglas Hurd, the then Home Secretary, said: "I do not think there is a case for auctioning the prisons or handing over the business of keeping prisoners safe to anyone other than government servants."<sup>4</sup> Attitudes, especially political attitudes, change.

Public perception of volunteer forces may include recognition of their authority to act in the circumstances Ms Wilkinson discusses: a uniform is a uniform. Again, it may not. As suggested above, the employers of reservists may not be able to afford subsidising the emergency services in this way. How will a reservist's normal work load be dealt with if he is needed to act as a traffic policeman or a carrier of sandbags during the week? Carrying out these duties on Sunday may not be a problem but Monday and Tuesday might be, if an export contract needs completing. Has anyone seriously analysed the recruitment patterns (both economic and geographical) of the reserve forces? The very fact that the reserve forces are volunteers means that some areas will have better support than others. It is also necessary to remember that no matter how good a voluntary force is, it will, by its very nature, take time to assemble, particularly on weekdays. After all, no one can force volunteers to turn up.

Of course, it is possible to overstate such objections. The emergencies which could be seen as suitable for support activity by an organisation modelled on the National Guard rarely take place in the UK. The incidence of both natural and man-made emergencies in the UK is far less than in the USA, where the legislative arrangements are, in any case, different. It may not be appropriate to compare the role of the TA and the National Guard.

There are also what might be loosely called the human factors, the factors that result in professional rivalries. How would police specials or retained firefighters, for example, see TA activity in support of the emergency services? As competition? What conflicts would rage if the reserves were to be given the substantial investment required for training and equipment in a new supporting role? Who would supervise their use and how would they be controlled, particularly if their use resulted from political or financial pressure?

In addition, there are theoretical objections to the use of what essentially are paramilitary forces in civilian disasters, except in the most urgent and short-term circumstances. Despite the currently fashionable all-hazards and integrated emergency management approach, which implies that there is a read-across from war planning to peace planning, the situation is not clear cut. What is acceptable in a time of tension or war, is not necessarily acceptable in peace. The role of the police as, seen in civil-defence war duties in the 1970s for example, required a martial order unacceptable in peace.

## Conclusions

It is true that civil defence relied heavily on volunteers for more than 40 years, but that is no longer the case. By 1992, "... what had been a well-organised, effectively administered, trained and cost-effective national system for civil protection had been written off, along with the 30,000 volunteers (Royal Observer Corps, warning officers, scientific advisers, warning point operators, community advisers, etc), their expertise and organisations."<sup>5</sup>

Reservists and specials are a valuable resource for their parent services, but it would be unfortunate if their roles suffered from ambiguity through over-extension. Reserve military forces appear to have a clear role in supporting the regular military if the latter are involved in a MACC situation. But their use in such situations is limited. To suggest that this role be significantly extended could be frustrating for the reservists, because they are likely to find that local authorities and the emergency services are not prepared to exercise with them as other types of training are considered more important, or because there is insufficient money for overtime. The uniformed services are also in the midst of controversial reforms of their own.

The UK is not the USA; it does not have the same problems of scale or severe weather. The UK has abandoned a national civil-protection structure in favour of reliance on operations at the level of local authorities, but it does not have a fragmented police system which needs to be backed by a state police or a volunteer reserve like the National Guard. If anything, it has a regionally managed national force with different management and operational problems, some of which could, perhaps, be mitigated by use of a disciplined and accountable force of specials.<sup>6</sup>

Soldiers are soldiers and policemen are policemen. Reservists and specials have, after all, chosen different organisations to volunteer for, and the existing arrangements for using them in peacetime are unlikely to be enhanced by an ambiguous extension of their role. The National Guard is not a model for either the UK police or the reserve forces.

## References

- 1 Wilkinson, S., "Force for Peace?", How Volunteer Reserves Could Assist the UK Police", *Disaster Management*, Vol 6 No 2, 1994, pp74-76
- 2 Ingleton, R., "A CRS for Britain?", *Police Review*, September 21, 1990.
- 3 For example, *Police Review*, March 25, 1994.
- 4 Quoted in *The Independent on Sunday*, September 5, 1993.
- 5 Jackson, A. A., "Recent developments in civil defence and emergency management in the UK," Dundee, 1993.
- 6 As suggested by a letter in *Police Review*, April 1, 1994

# REPORTS

## Reducing the Vulnerability of Jamaican Schools to Earthquakes

On January 13, 1993, Jamaica was affected by an earthquake measuring 5.4 on the Richter Scale, with a depth of 10 kilometres. A closer investigation of the earthquake revealed that it occurred along one of the major fault lines in Jamaica (the Wagwater Fault), and just five kilometres from the nation's capital. It is felt by several geologists, that had the earthquake been of a greater magnitude, the extent of damage and probable loss of life would have been higher.

Jamaica has in the past experienced both minor and severe earthquakes. The Seismic Research Unit at the University of the West Indies reports that hundreds of minor tremors are recorded in Jamaica each year. Despite this, however, Jamaicans are yet to develop an awareness of the danger of earthquakes. This is particularly necessary due to the uncontrollable vulnerability of Jamaica to earthquakes.

Jamaica lies close to the edge of the Caribbean Plate, just about where it abuts the North American Plate. Repeated interfacing between the two, have resulted in several earthquakes affecting the island. Examples of these are the Port Royal earthquake of 1692 and the Great Kingston earthquake of 1907. Some 3,000 persons were killed in the 1692 earthquake and another 1,000 in the 1907 incident. Three quarters of the city of Port Royal sank beneath the sea in 1692 and with it a significant portion of Jamaica's history. In Kingston the business district sustained severe damage from the great fire which followed. Other significant earthquakes have occurred but with less damaging effects. It could be deduced, therefore, that the relative infrequency with which major earthquakes occur has caused a state of unpreparedness among most Jamaicans.

Jamaicans are still unaware of what action to take before, during and after an earthquake. A large number of persons have little or no knowledge of what causes earthquakes and the extent of damage which they are capable of producing. This is despite the efforts of the local disaster management agency and parish disaster committees to make people more aware. Consequently, earthquake drills are not a regular feature in schools, factories and offices and not enough of these organisations have earthquake plans. The need for pre-planning is more so important in schools, as on

any given weekday, a large majority of the nation's people, (750,000) can be found in our schools.

The level of preparedness to a large extent determines the nature of an individual's response to earthquakes. The response of teachers and students to the earthquake of January 13, 1993, indicated to the Office of Disaster Preparedness and Emergency Management (ODPEM), that the school population is largely unprepared for a major earthquake. Students and teachers panicked and in many instances, teachers ran leaving students unattended. Chaos and panic reigned throughout the school population. Following the earthquake most schools were dismissed, leaving students without any guaranteed after-care, immediately following the event. The nature of the response in schools therefore could largely have been described as inappropriate.

In light of these findings, ODPEM launched an island-wide training programme for the nation's schools. The programme dubbed 'Earthquake Safety Workshops for Teachers', sought to train teachers in writing earthquake plans and to prepare their schools for the onslaught of such an event. These workshops were designed jointly by the Office of Disaster Preparedness and Emergency Management and the United States Agency for International Development (USAID) and were aimed at sensitising teachers to the importance of planning for earthquakes and to motivate them to take the necessary precautions to minimise their effects.

The programme began in April last year and ended last May. At the end of this period, a total of 40 workshops had been conducted in all parishes and two teachers invited from each school trained. The topics were: the vulnerability of Jamaica to earthquakes; identifying non-structural hazards in schools; and plan development and post earthquake shelter care. These are areas which teachers will find useful in the writing of their earthquake plans.

By launching such a programme the Office of Disaster Preparedness and Emergency Management believes the school population will be prepared when the next earthquake strikes, and be ready for quick action. The level of preparedness in schools is also expected to minimise the extent of damage caused to schools by earthquakes. This is of particular importance as schools are not only centres for learning but serve as shelters

in the event of an emergency. As mass care shelters, schools must remain safe before, during and after an earthquake, so as to provide a safe haven for victims.

This greater awareness of earthquake may also lead to more intense studies into the nature and behaviour of earthquakes. These can only serve to complement the work of groups such as the Mona Disaster Studies Work Group, recently launched at the University of the West Indies. This work group undertakes research into natural hazards to which Jamaica is most vulnerable and shares its information with other key agencies with disaster-related roles and responsibilities. These include the Underground Water Authority and the Geological Survey Division. Through liaison with ODPEM, efforts will be made to reduce Jamaica's vulnerability to natural hazards.

In the long run, the staging of these workshops will help in developing an earthquake awareness culture in the nation. The current schools population will in the future be armed with the theoretical and technical skills necessary to prepare for earthquakes. The present generation of students will hopefully pass on their knowledge to future generations, thereby ensuring that each generation is always prepared.

Maxine Francis

## The Changing Face of Disaster Management in Jamaica

The local Disaster Management Agency in Jamaica has been granted statutory status by the Government of Jamaica. Under the *Disaster Preparedness and Emergency Management Act* of June 25, 1993, the agency is now known as the Office of Disaster Preparedness and Emergency Management (ODPEM). This replaces the former Office of Disaster Preparedness and Emergency Relief Co-ordination (ODPERC), which was established in July of 1980.

The new organisation is headed by a Board of Directors, with an appointed Director General, who has responsibilities for the day-to-day operations of ODPEM. There are four functional areas, to ensure the effective delivery of disaster preparedness measures to the public. These are: Corporate Services, which deals with administration and finance; Preparedness and Emergency op-