Perception by Counter Disaster Personnel of the risks of bulk transport of dangerous goods along the Brisbane-Gladstone transport corridor

This Southeast Queensland research team reports on the wide range of perceptions and responses of disaster personnel to a major dangerous goods road accident scenario.

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Counter Disaster personnel stationed along the Brisbane to Gladstone road-rail corridor took part in focus groups aimed at eliciting their perceptions of the hazards associated with the bulk transport of dangerous goods that occurs along this route. Six groups, each representing a Disaster District, discussed their responses to a major road accident scenario on a local stretch of the Bruce Highway involving two fuel- carrying tankers and a resulting explosion (BLEVE). That is, a low probability, but high-impact and rapid-onset hazard. A wide range of perceptions and responses to the scenario was noted both within groups and between groups, reflecting differing hazard and risk perceptions, resource availability and mobility, and other geographical factors. Initial management of the hazard, establishing safe zones, effecting evacuation, managing traffic and dealing with casualties were all variously raised as challenges to the emergency services personnel and the frameworks of coordination and response under which they operate. Some settlements along this transport corridor were identified as being notably vulnerable to a dangerous goods accident because of their proximity to the highway, and the relative inaccessibility of the resources needed to cope with such an event.

Project Background

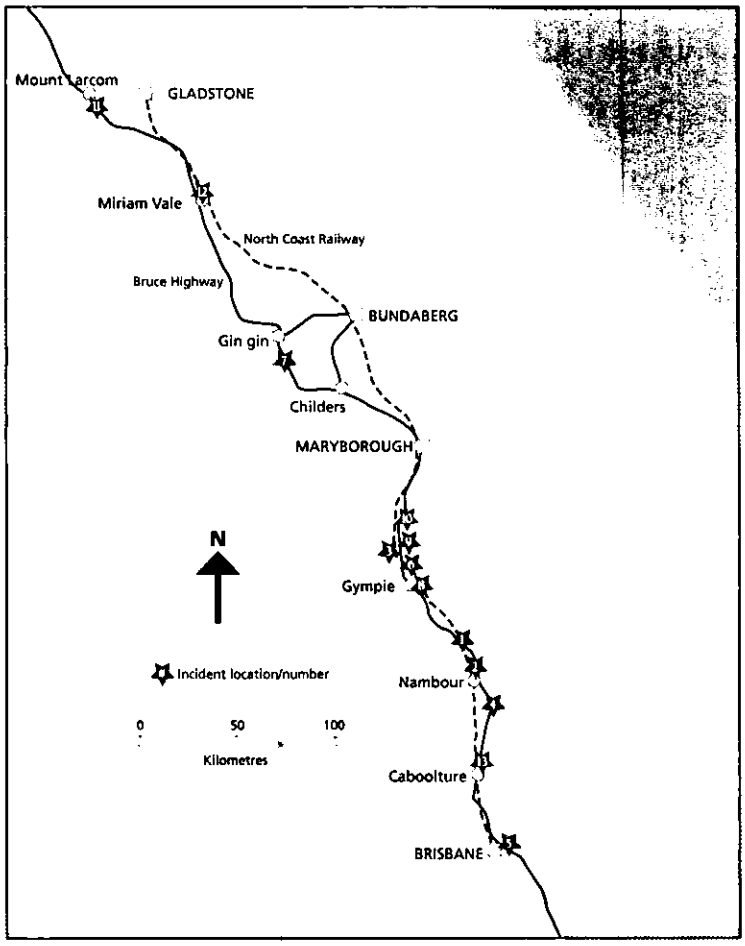
Brisbane and Gladstone, located some 600 km apart on the east coast of Queensland, are the two major heavy industrial centres of Queensland. Both have significant chemical industries, and there is considerable bulk transport of dangerous goods[1] along the Brisbane-Gladstone road-rail transport corridor. Over the past decade, several road accidents occurred involving bulk-transport vehicles carrying dangerous goods along this route, resulting in deaths, injuries and major losses of loads. Childs et. al. (2001) documented these incidents[2] and broadly identified some of the factors along the corridor that contribute to risk and vulnerability in relation to dangerous goods transport.

The aim of the present research was to capture perceptions held by key emergency services personnel (primarily responsible for local counter-disaster operations), government and community workers located in several centres along the Brisbane-Gladstone route regarding the risks of the bulk transport of dangerous goods. The foci of the present study are to elicit from these groups: levels of awareness of dangerous goods travelling along the Brisbane-Gladstone route, perceptions of the risks of potential emergencies involving such materials, and envisaged response and recovery strategies for an accident scenario.

The research results presented here summarise the main elements of a report submitted to the Queensland Department of Emergency Services (DES) in December 2001 following a joint initiative between DES (CHEM Unit) and the Queensland University of Technology (School of Humanities and Human Services).

1 The term 'dangerous goods' is used in relation to chemicals considered to be sufficiently hazardous to require regulation of their transportation under the Australian Dangerous Goods Code (the ADG Code).

2 In 2001, there were three additional incidents at Mt. Larcom, Miriamvale and Caboolture resulting in two deaths.



Map 1: The Brisbane-Gladstone Transport Corridor. Refer to Childs et. al. (2001) Table 1 for incident details.

The Brisbane to Gladstone Transport Corridor

A range of dangerous goods travels via bulk tankers and intermediate or smaller containers along the Brisbane to Gladstone transport corridor. These include petroleum, liquefied petroleum gas, liquefied ammonia, molten sulfur, liquefied chlorine, concentrated hydrochloric acid, compressed hydrogen, and sodium cyanide.
The primary road route comprises Brisbane's Gateway Motorway, the Bruce Highway (National Route 1) and feeder roads to/from regional centres and Gladstone. The rail link (North Coast railway) closely parallels the highway, with the two routes being rarely separated by more than a few kilometers except in one section between Maryborough and Gladstone (Map 1).
Both routes pass either through or near numerous settled areas, including northern Brisbane localities, the Sunshine Coast Hinterland, regional centres and smaller towns. Although the Bruce highway now bypasses several of the larger centres (e.g. Bundaberg, Nambour and Caboolture) by several kilometers, the highway remains the 'main street' for smaller towns such as Childers.

Qualitative analysis of the combination of risk factors (impact radius of potential *dangerous goods* emergencies, population potentially exposed, local geography and highway conditions and likely level of emergency resources) suggested varying levels of potential risk and vulnerability in the present dangerous goods context for several geographical regions along the route (Childs et. al. 2001). With the expected increase in the quantity of chemicals passing along the corridor commensurate with the projected population[3] and industrial growth in Southern and Central Queensland[4], there is a need to systematically assess risks and community vulnerability along the corridor with a view to contributing to the preparation of emergency services for dealing with any hazard arising from such transport. While the probability of a catastrophic accident is very low, the consequences of such an accident, should it occur in a built-up area, could be very severe. The potential risk from the use and transport of dangerous goods throughout the region must, however, be balanced against the many economic, employment and other benefits that accrue from these activities.

Methodology

The broader context of the research was a disaster/emergency risk-management framework, based on the Australia/New Zealand Standard on Risk Management (AS/NZ 4360: *Risk Management)* and an approach to vulnerability assessment outlined by the Australian Emergency Management Institute (Hunter, 1996)[5]. This includes a description of community risk perception. While the availability of physical resources is an important factor in coping with any disaster, the effectiveness of such resources is a function of the quality of emergency preparedness and planning at the local level. Preparedness and planning, in turn, is a function of numerous factors, but is anchored by risk perception (e.g. Young 1998; Zamecka and Buchanan, 1999). Community vulnerability to the hazards associated with the bulk transport of dangerous goods, thus, depends in the first instance on awareness and risk perception of emergency response personnel along the route, and on their perceptions of possible response and recovery

3 *Population Trends and Prospects for Queensland 2001,* available from the Planning Information and Forecasting Unit, Department of Local Government and Planning, Queensland.

4 Mooted developments include a new alumina refinery at Yarwun; a magnesium production facility at Rockhampton (Stanwell), about one hour's drive north of Gladstone; an ethylene dichloride plant at Gladstone.

5 Hunter's (1996) model includes several stages of risk evaluation and assessment: (i) description of the hazard, the community, the environment and the emergency services; (ii) analysis of interaction between the hazard, the community, the environment and the emergency services; (iii) assessment of community risk perception; (iv) ranking of vulnerabilities; and (v) comparison of risk to existing risk criteria.

Table 1: Disaster Districts where research focus groups were held, with corresponding scenario locations.

DISASTER DISTRICT	SCENARIO LOCATION	DESCRIPTION
Redcliffe	Burpengary	Highway passes through built-up area with entry ramp and highway speed limits*.
Sunshine Coast	Cooroy	Highway passes near built-up area with entry ramp and highway speed limits*.
Gympie	Gympie	Highway passes through extensive built-up area with intersections and urban speed limits*.
Maryborough	Howard	Highway passes through built-up area (small town) with intersections and urban speed limits*.
Bundaberg	Gin Gin	Highway passes through built-up area (small town) with intersections and urban speed limits*.
Gladstone	Gladstone South (Kinkora)	Feeder road from highway passes through extensive built-up area with intersections and urban speed limits*.

* Highway speed limits – 90–110 km/h; urban speed limits – 60–80 km/hr

strategies in potential emergencies. The methodological challenge for the research was therefore to elicit and capture information relevant to these factors.

Data collection

Focus group discussions with appropriate emergency services personnel along the route were used to gather perception and response information concerning the risks of dangerous goods incidents. At each focus group, general questions addressing risk perception, and a local road accident scenario involving bulk dangerous-goods transport, provided the catalysts for discussion (see Map 1 and Table 1.). Given the scale of the proposed scenario (see below), it was resolved to access Disaster District Control Groups (DDCG)[6] for the project because of their membership of senior emergency service personnel and other representatives (local government, government services, health professionals etc.). It was later noted that less senior, operational personnel and crews often attended the project's focus group meetings, providing a practical perspective. Although access to emergency services personnel was gained via the DDCG, the committee itself was not the focus of the present study, rather the attending Emergency Services representatives were.

Focus group meetings were held in the six non-metropolitan Disaster Districts along the Brisbane-Gladstone route (viz. Redcliffe, Sunshine Coast, Gympie, Maryborough, Bundaberg and Gladstone.

Perceptions of the risks posed by the scenario and possible responses to these risks were sought from focus-group participants. When necessary, the focus group facilitator (project research officer) stimulated discussion through a series of structured questions. Areas of investigation and subsequent data-capture were summarised under the headings of: awareness of dangerous goods passing through local areas; communication; impact assessment; mobilisation of resources; and location of resources. Discussions arising from the scenario were further directed by the facilitator to consider the progression of responses from pre-incident, through to event response, post-incident and recovery phases. Generally discussions took approximately two hours and were scheduled as part of a DDCG meeting. Police, Fire, State Emergency Service (SES) and local government institutions were well-represented. The Ambulance Service and medical authorities were represented at most but not all meetings.

Several information-gathering and recording strategies were employed by the researchers. One of the project's chief investigators was present as an observer on each occasion to record discussion points. In addition, participants (identified by service-affiliation and not as individuals) were asked to write their key thoughts on formatted information-recording sheets provided (structured as described above). Usually within three days of each focus group, the research team met to identify the key issues that had emerged.

The scenario

In the case of a dangerous goods emergency or chemical disaster, the onset speed of the hazard is usually rapid and, consequently, warning time for evacuations is most likely to be minimal or non-existent. Thus, in terms of community vulnerability one is dealing basically with pre-existing risk perceptions, the capacity for rapid and

6 As a result of the State Counter Disaster Organisation Act, 1975, Disaster Districts, Disaster District Control Groups (DDCG) and Local Government Counter Disaster Committees (LGCDC) were established in Queensland. Membership and functions of the separate groups/committees are outlined in *Counter Disaster and Rescue Services* (2001a; 2001b)

Participants thought the threat to their communities from the transport of bulk chemicals/dangerous goods was increasing.

effective response by emergency services and the community's capacity to respond post-event. The latter is particularly related to the resources of the emergency services to evacuate post-event, and to cope with potential casualties and injuries resulting primarily from the effects of fire, blast or toxic gas release.

The written scenario presented to focus groups in the present research involved a collision between a petrol tanker (20,000 litre) and an LPG tanker at a local intersection. This resulted in a substantial fire and a BLEVE[7] approximately 15 minutes later. Locations varied from an isolated stretch of the Bruce highway near the small settlement of Howard to the busy northern fringe of the Brisbane metropolitan area (Caboolture). Potential blast and danger zones were presented visually to the focus groups in the form of a short video of a BLEVE incident[8], maps and air photos. Under the scenario, the immediate consequences following the BLEVE were 20 casualties, 40 severe injuries and traffic banked up on the Bruce highway. The focus groups were also asked to consider questions of community recovery in the medium and longer term.

Emergent issues from focus group meetings

This research proceeded on the understanding that individuals would not be directly identifiable in the reporting of results. Therefore, the following information is presented in a manner, and at a resolution, appropriate to that understanding. Only when comments are general by nature, and do not directly identify individuals, are they attributed to particular focus groups or participating organisations. Some comments reported do not relate directly to the scenario used, but rather to response to dangerous goods emergencies in general. The descriptions below sometimes reflect perceptions of senior officers anticipating what crews attending incidents would do, and sometimes reflect the perceptions of those who were likely to be actually attending an incident at a given time. Attendance and participation in focus groups on the day was the determinant of sources of perception.

Awareness and risks of chemical hazards

Participants were generally aware of a wide range of hazardous materials transported along the road and rail routes in bulk containers. Fuels (petroleum, diesel LPG), farm chemicals (fertilisers and pesticides), chlorine, ammonia, acids, explosives and cyanide were the most frequently nominated. From the knowledge of the researchers, these results indicate a reasonable picture of the types of dangerous goods moving along the route. Nevertheless, it was commonly reported as a cause for concern that information regarding quantities and timing of shipments was not easily available to local emergency service personnel. Focus-group participants were overwhelmingly of the opinion that the threat to their communities from the transport of bulk chemicals/dangerous goods was increasing.

Responses to scenarios

In all focus groups there was a degree of initial skepticism by some individuals regarding the probability of the scenario eventuating in reality. In most cases this skepticism dissolved (a) after the BLEVE video (Cairns 1987) was shown, and (b) after initial discussion established a recognition of the serious consequences of such an event, albeit at a low probability of occurrence.

There was no consistency of emergency response to the scenario across the focus groups and, hence, no consistent indication that a rote response would generally be elicited from the invocation of a standard set of operational procedures and instructions. The scope of the present research does not, however, extend to evaluating the envisaged responses in terms of the formal procedures, but simply notes this inconsistency and seeks to contextualise it within overall emergency response and community vulnerability.

Initial risk perception and response

Focus groups indicated that, in the initial stages of the scenario (i.e. pre-BLEVE and during the explosive phase) indicated that Queensland Fire and Rescue

7 BLEVE. Boiling Liquid Expanding Vapour Explosion. Computer modelling carried out by the CHEM Unit, Queensland Department of Emergency Services, indicates that a BLEVE of a 14 tonne LPG tanker would have injurious thermal effects within a radius of 240 metres.

8 A video compiled by QFRS from a set of still photographs of the Cairns BLEVE in 1987.

Service (QFRS) officers, rather than Police, would take the leadership role on the ground if present.

Two broad response patterns were evident in dealing with the pre-BLEVE fire, should Queensland Fire and Rescue Services (QFRS) crews arrive in time. One view was that if QFRS could get to the scene quickly enough (within minutes) and play water onto the LPG tanker to cool its temperature, a BLEVE could be avoided. Some QFRS officers considered that taking such action, would lead to a high probability of injury or death to attending personnel placed in the danger zone. Nevertheless, an emergent view was that this approach may 'buy time' for evacuating the public. Furthermore, some QFRS participants felt that pressure from public and community expectations would mean that crews would attempt to fight the fire – even if the professional judgement suggested that to do nothing, except to evacuate the area, was the best action. Other QFRS officers made a much more conservative initial risk assessment and insisted that 1500m clearance be achieved from the accident site. One group commented that after conducting an evacuation there would be little more that they could do to modify the hazard.

Evacuation and establishing 'safe' zones

A critical question explored by all focus groups was how to effect an initial evacuation of crowded areas at risk in the post-accident pre-BLEVE period; for example shopping centres adjacent to the accident scene, and motorists in vehicles 'banked up' along the highway. When the need to evacuate the public from the accident vicinity was not raised by focus groups, the question was prompted by the facilitator.

There was general acknowledgment of the potential for an initial lack of coordination among the emergency services in establishing safe zones and evacuating those deemed at risk. This was arguably driven by the unfamiliarity, speed and scale of the proposed incident. Focus group participants were unaware of specific evacuation plans under the circumstances of a rapid-onset hazard such as the one presented. Given that the available time for the required evacuation was very short (i.e. 15 minutes under the scenario), participants generally acknowledged that it would probably have to be achieved by first-arriving QFRS or police officers.

A concern of several police officers who had had experience with evacuations was the difficulty of managing the public under circumstances of danger. Given the scenario, the comment was made that it was easy enough to stop traffic, but it may be quite difficult to persuade people to leave their vehicles unattended in order to evacuate an area. Police participants reported resentment from members of the public unwilling to accept Queensland Police Service (QPS) authority when being asked to interrupt their business or activities and to leave an area. State Emergency Service volunteers were noted to face similar issues. The solution was seen to be the declaration of an 'emergency situation' under the *Public Safety Preservation Act, 1976*[9] which gives additional powers to police.

Skepticism about the likelihood of the disaster scenario dissolved after participants were shown evidence of previous events.

Establishing safe distances for the public (and the emergency services) and maintaining these was seen as another problematical issue. Hazard identification and risk perception on the part of emergency services personnel at the scene clearly becomes critical in this context. One focus group commented that when an evacuation zone had been established, the public would 'take the lead' from emergency service personnel as to the distances that should be maintained from an incident. The problem was that in a situation where emergency service personnel have entered the danger zone, the public may underestimate the safe distance required, and, without good crowd control members of the public may enter the danger zone.

Discussion of the practicalities of achieving a successful evacuation and controlling crowds under the scenario conditions raised some communication issues. One interesting line of inquiry questioned how emergency services personnel at the scene would rapidly and authoritatively issue evacuation orders directly to the public. Do police officers possess public address systems

9 This can be invoked very quickly by a commissioned Police officer, even if not present at the scene.

or hand-held loud hailers in their vehicles? Several police respondents conceded that such equipment may not be readily available, given the rapid-onset hazard.

Traffic control

One of the main topics of discussion in several groups was how to manage gridlocked traffic caused by such an accident on the highway. This problem was particularly severe for the Burpengary scenario location (Redcliffe Disaster District focus group) because of heavy traffic just north of the metropolitan area. Relaying information both among emergency service personnel and to the public (i.e. stationary gridlocked motorists), clearing congestion on the highway, diverting traffic to side-roads and evacuating casualties were seen as critical problems. The possibility was raised that some critically injured victims may actually expire before they could be evacuated because of delays caused by traffic congestion. A suggestion was that this situation could be ameliorated by the use of helicopters. In other less busy locations, however, the traffic control issue was regarded as much less of a problem as drivers may have more room to manoeuvre and may have local knowledge to take alternative routes.

Resource availability and mobilisation

A key concern for most focus-group participants was the availability and mobilisation of adequate resources to initially deal with the accident (and hazard), and then the chaotic aftermath of the scenario. At all meetings, emergency service representatives voiced strong concern over the accessibility of appropriate resources at the incident locations. Issues involved the availability of: emergency service personnel (particularly experienced personnel), communications, medical aid, equipment, water and foam.

Across all groups and scenarios, it was generally accepted that off-duty personnel would have to be recalled, and resources of surrounding localities requested. Given a fast-onset hazard, the time taken to contact such personnel and for them to arrive at the scene were significant issues. 'Next available' QFRS, QAS[10] and QPS resources could be up to 30 to 45 minutes travel time away and it was not always clear that even local services could reach the scene 'pre-BLEVE'. Furthermore, highway traffic congestion was deemed likely to impede the arrival of emergency services, and senior officers, whose 'on site' presence would be desirable in the circumstances. State Emergency Service (SES) personnel, generally viewed as having potential roles in crowd control and traffic monitoring, could take an hour or more to mobilise, even if locally available.

The availability of adequate and experienced personnel at the scene was viewed as potentially important to aspects including hazard and risk identification, and evacuation. In some regions and remote localities, it was suggested that the initial tasks of hazard identification (i.e. recognising the potential for a BLEVE) and the immediate response may fall to an auxiliary fire officer (e.g. Rural Fire Service). There was speculation that these operatives would not be adequately resourced, and may not recognise the risk of a BLEVE.

One focus group raised the problems of establishing a command post and effecting evacuations where incidents occurred in areas serviced by small or 'single officer' police stations. Settlements along the Brisbane-Gladstone corridor were specifically identified as being representative of these contexts. Therefore, from the perspective of resource accessibility, such small communities may be the most vulnerable to this type of hazard.

Further discussion of the experience levels of emergency services personnel likely to attend the emergency scene occurred at some meetings. This was particularly raised by police representatives in one region where there are high proportions of relatively inexperienced officers. This was seen as a potential problem if junior officers were left with the difficult task of effecting a rapid evacuation of members of the public from the high risk blast area (assuming such a zone had been defined). This situation is exacerbated where senior officers would not be able to easily access an incident location due to highway gridlock. QAS crews were also identified as likely to have inexperienced crew members in some areas. QFRS cited their policy of maintaining a crew of 'balanced experience' on fire trucks with no more than one junior (i.e. <3 years experience) officer on an operational vehicle at any one time.

In terms of communication infrastructure, some problems were noted with the mobile phone network encountering 'dead spots' along some stretches of the highway. A similar problem was also noted for dead-spots for 2-way radios in some areas. One group commented that 'truckies' with radios may provide an opportunity to gain first-hand information from the incident scene in the early stages, and where access problems existed for initial emergency service vehicles.

Given the specific nomination of casualty numbers within the scenario, access to, and mobilisation of emergency medical support was seen as critical. Discussion of the treatment of patients with severe burns turned to the allocation of hospital beds. From the advice of medical personnel participating in the focus groups, the capacity of most regional hospitals (relevant to this study north of Brisbane) to deal with emergency burns victims appears to be limited to 3–4 beds. It was suggested that the further allocation of burns victims would most likely be handled from Brisbane, and

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involve patients being transported to Brisbane hospitals by air. One group speculated that this mode of patient transportation could take several days if there were multiple casualties. This group also raised the issue of 'tough decisions' having to be made in terms of allocating relatively scarce medical resources/ opportunities to the injured at the time of the incident.

There was a strong opinion expressed that heavy machinery for site works should be available through the local government channels. Provision of adequate protective clothing (level 2 or 3 suits) for QFRS officers and auxiliary fire officers dealing with toxic releases in small towns was also raised.

Recovery phase

Following considerations of immediate response to the scenario, the facilitator directed discussions to the longer-term recovery phase. In recovery, there is an issue of differentiating the broader and longer-term roles of 'disaster management' and the shorter–term roles of 'incident management' that may directly involve operational emergency services and SES personnel. Depending on the perception of 'disaster' vs. 'incident', different roles and responsibilities within the disaster management framework should be activated. This relates to how well the various players in Emergency Services understand the impact that the event has on the community. The disaster management system only responds if the impact on the community cannot be adequately managed by local emergency services and existing community arrangements[11]. Investigation of this aspect is beyond the scope of the current research, but may have implications for explaining some of the observations reported below.

Wider community dislocation

Social dislocation ensuing from the scenario presented was not generally raised as a planning issue by focus-group participants in this project. This may reflect a need to prioritise the management of the immediate, physical threat and/or result from perceptions of the scenario and committee roles as indicated below. Only in one group did an individual raise the issue of social dislocation; the comment being that the affected community would be 'in shock'. Another group was prompted to discuss longer term social recovery, but offered few specific ideas on the needs or management of such. General uncertainty surrounded the issue of organisational responsibility dealing with the wider community, particularly in the immediate and medium-term post-incident phase. In the longer term this responsibility would be that of relevant government departments and community organisations (e.g. Department of Families, Red Cross, etc.)

Further issues: roles of committees

The present research used Disaster District Control Group (DDCG) meetings to access emergency services personnel to investigate their perceptions of a dangerous goods transport incident and associated rapid-onset hazard response. The research focus was not specifically on critiquing the roles and operations of organisational structures, such as DDCGs or Local Government Counter Disaster Committees (LGDCGs), although the relevance to the current research of their separate functions is clearly recognised. Nevertheless, comments and observations made at focus group meetings suggest that a broader set of issues can be distilled in this context, and await further investigation. The following represents an attempt by the researchers to articulate these issues, based on information and observations gained from the focus group meetings and follow-up work.

One issue to emerge from the research relates to the roles of, and links between the DDCG and the LGCDC. The relative responsibilities of these committees is established within State law and disaster plans (State Counter Disaster Organisation Act and the State Counter Disaster Plan). Nevertheless, faced with the practicalities of responding to the scenario presented in the project (a rapid-onset, high impact technological hazard) relative roles and activities of the groups, as perceived by personnel involved in response activities, were sometimes blurred. Again, the researchers caution that this observation emerged from focus group discussions, and its investigation was not originally part of the research design.

Opinion varied widely on the appropriate responsibilities of the DDCG and the LGCDC in the case of the specific scenario presented. The researchers noted varying degrees of willingness to take ownership of the scenario situation across the groups. In some, it was suggested that DDCGs would be quickly activated, while not in others. It was recognised that the event would unfold too quickly for either the DDCG or LGCDC to convene, let alone play an effective role initially. The immediate response phase would most likely be dealt with exclusively by operational personnel. Later response and recovery is therefore the time for potential responsibility for these committees. The DDCG was seen as playing a role in the recovery phase of a disaster in some focus groups, while in others members saw their group as having no role at all in the longer-term recovery phase.

The distinction in determining the roles of the two committees was contingent upon the perception of the particular research scenario as being either a 'disaster' or an 'incident'; the former being a larger scale and

11 Wayne Ripper, Director, Disaster Operations, Counter Disaster and Rescue Services, Queensland Department of Emergency Services.

therefore a more serious event, particularly in terms of the degree to which the community is able to cope. If an event is deemed to be a 'disaster' (i.e. beyond the normal coping capacity of the community), a key role is activated for the DDCG, whereas if it were a 'major incident', this may not be the case, and responding emergency services, the QPS and LGCDC maintain key responsibilities. The question as to whether the scenario of the present research was a disaster or an major incident was therefore critical, yet the focus groups were not consistent in categorising the scenario as either a disaster or an incident.

Key Recommendations

Based on the project results, the researchers suggest the following recommendations:

Recommendation 1: Awareness of chemical hazards

That opportunities be identified to improve the availability to local emergency services of information regarding the transport of dangerous goods along the Brisbane-Gladstone corridor.

A major cause for concern was that information regarding quantities and timing of shipments of dangerous goods through communities was not easily available, and that hazards from such sources were increasing. A record of average annual movements of bulk dangerous goods loads along transport routes could be established. An administrative system would be needed to collate and analyse the data relating to both road and rail transport.

Recommendation 2: Responses to scenario

That community vulnerability to dangerous goods transport along the Brisbane-Gladstone corridor be further investigated by extending existing hazard mapping programs to include bulk transport of dangerous goods.

The hazard mapping program within the Department of Emergency Services could be developed further to integrate vulnerability associated with the hazard. Furthermore, due to the relative rarity of major dangerous goods incidents or disasters to provide experience, training based on mapped databases could become the primary mechanism for improving emergency response.

Recommendation 3: Resource availability and mobilisation

That the causes of the wide variability found in response between the focus groups to the research scenario be investigated by considering factors such as local resources, location and training.

Availability and mobilisation of resources were identified as major issues. Limited resources may be an unavoidable reality in small centres. An integrated strategy utilising the resources of a network of larger urban nodes along transport routes could improve rapid deployment of specialised resources to smaller centres when needed. More effective communication systems would reduce mobilisation times.

Recommendation 4: Evacuation

That community safety programs along the corridor include an education component dealing with appropriate responses by members of the public to emergencies arising from the transport of dangerous goods through communities.

The need to protect public safety by prompt evacuation in the case of dangerous goods emergencies was well recognised. Public behaviour and acceptance of directives from emergency service personnel in such circumstances could be improved if public awareness of such hazards and appropriate behaviour strategies was increased.

Recommendation 5: Recovery

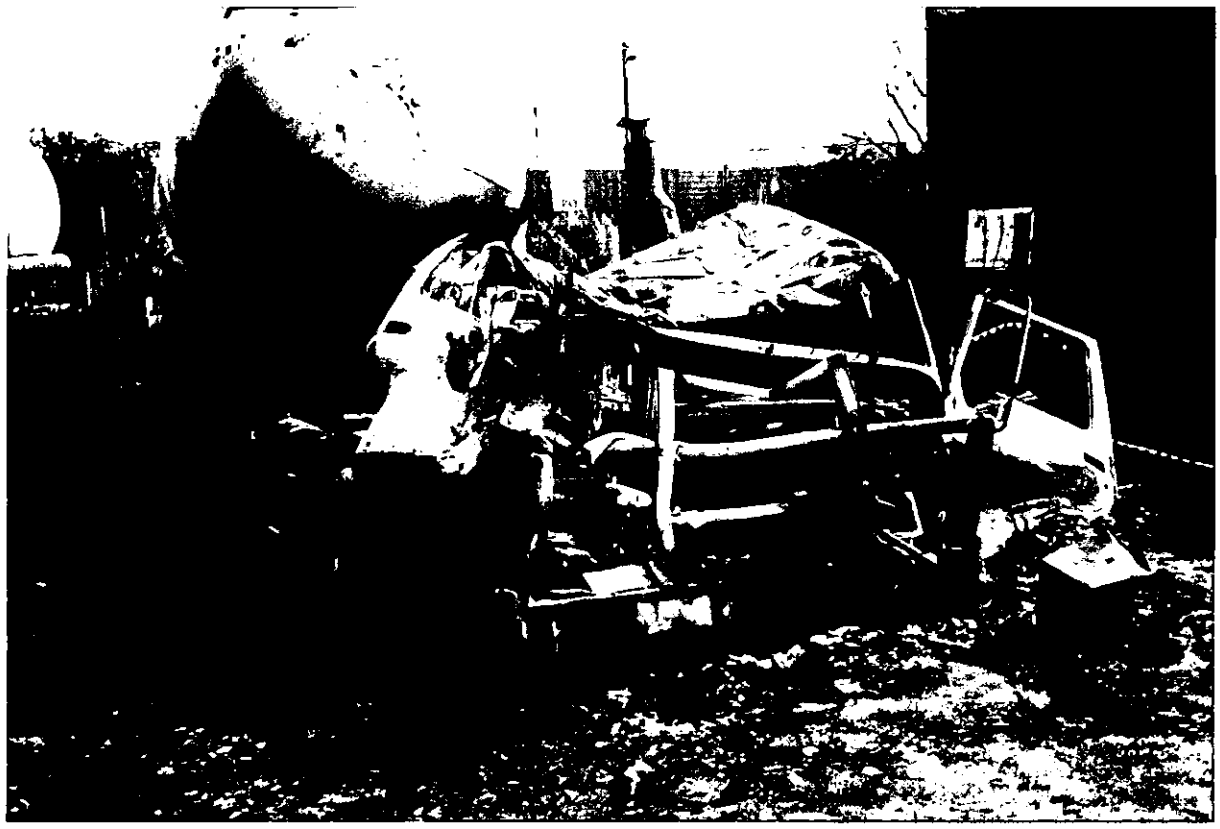
That the need to assist communities recover from dangerous goods disasters be clearly recognised in the disaster management system.

While the need to pay close attention to longer-term community recovery from natural disasters is well-recognised by the disaster management system, it is possible that this may be overlooked in the event of a major dangerous goods incident.

Recommendation 6: Roles of committees

That the interpretation of rapid-onset, dangerous goods emergencies as either incidents or disasters be further investigated. This would clarify the relative operational roles of Disaster District Control Groups and of Local Government Counter Disaster Committees in responding to this type of hazard.

While the immediate incident response phase in the case of a dangerous goods emergency would be dealt with exclusively by operational personnel, perception of the role of the two levels of disaster management committees (Disaster District Control Group and of the Local Government Counter Disaster Committee) in the recovery phase would hinge upon whether the emergency was regarded as a major incident or a disaster. Further examination of these roles is needed to clarify this issue.



At each focus group, questions addressing risk perception and a local road accident scenario involving bulk dangerous good transport provided the catalysts for discussion.

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