MULTI AGENCY RESPONSE TEAM (MART) APPROACH TO SEVERE WINTER EVENTS

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ABSTRACT

Scotland's worst gridlock in living memory occurred on the Monday 6th December 2010 as heavy snow fell during what was already a prolonged and extremely cold period. Hundreds of people were trapped in their vehicles for extended periods and part of the M8, the country's busiest road, was closed for over 48 hours.

Transport Scotland learned that communication between agencies needed to be improved and that information to the travelling public needs to be timely and more specific about the risks of travelling in severe weather.

Getting accurate and live travel information to the public during extreme weather is key to a successful winter service. Transport Scotland and key partners created the Scottish Multi Agency Response Team, or MART, to work even closer together, improving the quality and timing of information, as part of a more efficient response.

The MART can prepare, respond and recover from disruptive winter events adversely impacting the transport network. Working together in the Traffic Scotland National Control Centre (TSNCC) the MART partners provide live information to the public, businesses and media; and do so by a variety of methods accessible to the respective audiences, maximising the use of technology.

1. AIM

The aim of this paper is to demonstrate how the Scottish Multi Agency Response Team (MART) has successfully improved communication between responders and with the public, particularly in challenging and dynamic situation situations, to minimise disruption and improve safety during severe winter events and other types of major transport resilience challenges.

2. BACKGROUND

The number one priority for any transport authority or operator is safety, regardless of weather conditions. Severe weather conditions however, present greater challenges in keeping people and goods moving (whether by foot, road, rail, sea or air) whatever the mode. Provision of services, goods and utilities, access to customers, patients, premises and equipment is dependent on the transport infrastructure.

The severe weather experienced across Scotland during the past few winters along with two incidents of volcanic eruptions have presented particular transport challenges for all sectors of society.

During the winter period from 2012/13 there were a total of 169 severe weather warnings issued by the Met Office's National Severe Weather Warning Service (NSWWS), the majority of which were at the lowest (yellow) level (0 red, 15 amber and 154 yellow). This was a substantial increase in yellow warnings from 2011/12 when there were 92 severe weather warnings (2 red, 18 amber and 72 yellow) due to a prolonged winter period. In terms of snowfall and cold weather, the winter of 2010/11 was the most severe for 31 years and December 2010 was the coldest December for over 100 years.

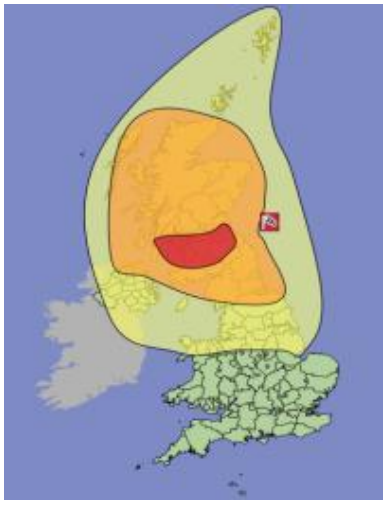

Figure 1 – Example map of UK weather warnings

The experience of all of these events has helped inform the planning, changes and improvements made by a range of partners, with the clear understanding that some disruption to service is inevitable. This paper acknowledges that all in the transport sector will continue to work together to minimise disruption and get Scotland moving, as safety criteria best allows, despite the challenges from severe weather events.

3. SIGNIFICANT EVENT

On Monday 6th December 2010 heavy snow fell during what was already a prolonged and extremely cold period. The M8, M9, M73, M74, M80 and M876 motorways across the central belt of Scotland were all badly affected by closures. Hundreds of people were trapped in their vehicles for long periods and part of the M8, the country's busiest road, was closed for over 48 hours.

3.1 Weather & Traffic

Between 2 and 5 centimetres (cm) of snow had been forecast with up to 10cm in higher areas. Conditions experienced were more severe with actual falls of up to 20cm onto already frozen road with temperatures below minus 10 degrees.

The timing of the snow fall coincided with the morning peak period. Minor accidents between vehicles created significant congestion. The continuing heavy snow fall and the fact that gritters were also stuck in the congestion, led to hard packed snow and ice forming across much of the central belt motorway.

Before roads could be treated and the resulting congestion cleared, those that had made it to work went home early. This additional load on the network combined with the already severe disruption caused widespread gridlock.

3.2 Impact

The crisis impacted on the reputation of the Scottish Government and resulted in the resignation of the Minister for Transport, Stewart Stevenson. There was also a reputational risk for Transport Scotland, the roads authority for the country's motorways and trunk roads.

3.3 Lessons Learnt

Transport Scotland responded proactively and is now better prepared for severe winter weather. Key problems of December 2010 included:

- Agencies working in isolation;
- Warning messages not clearly understood by the public;
- Limited situation reports about actual conditions on the road;
- No prior agreement of mutual aid;
- The lack of an effective mobile information platform to get information to users "on the move";
- Speed of information to the general public was slow and not comprehended; and
- Robustness of the traffic and travel information website to handle high volumes of visitors.

We learned that communication between agencies needed to be improved and that information to the travelling public needs to be timely and more specific about the risks of travelling in severe weather. Additional gritters, greater use of technology and getting information to people 'on the move' are just a few of the ways we have strengthened the Winter Treatments, Decision Making and Communication with Road Users.

The MART was established to respond to incidents that could result in a high risk of severe disruption or potential safety risks to the travelling public.

No road authority can guarantee to keep roads free from ice or snow, but by agencies working together we can reduce the impact of severe weather and get people moving again quicker.

4. PLANNING

Following the events of 6 December 2010 Transport Scotland took immediate action by introducing what is now referred to as the Six Point Plan. It was launched on 14 December 2010 to improve the resilience of the trunk road and motorway network during the severe winter weather.

The actions were:

- Storing additional salt and grit at key locations on the national trunk road network for quicker access;
- Using traffic management resources to enable diversions where necessary;
- Improving, further, the Operating Companies resources by adapting vehicles, such as landscaping vehicles, for clearing snow;

- Using the option of removing trunk road and motorway central barriers to allow easy access to blocked or broken down vehicles and to redirect traffic;
- Working with the Police to consider how HGVs could be stacked on the hard shoulder if conditions deteriorate to keep traffic moving; and
- Providing our winter fleet vehicles with welfare kits of blankets and water in support of other emergency responders.

To build on the Six Point Plan Transport Scotland took forward additional work to further increase resilience of the Scottish Trunk Road Network to the impacts of severe weather.

The work covered three key areas of winter maintenance:

1. Management and decision making;
2. Treatment; and importantly
3. Road users.

Planning is essential to the efficient and reliable delivery of transport services by providers and is a dynamic process. Plans should be reviewed and adapted as circumstances change, as new risks are identified, as new partnerships are formed and as new technology becomes available. Transport providers should also be flexible in their processes and response arrangements, exploring options and alternative approaches to the delivery of services.

A number of immediate actions were taken forward before the end of the 2010/11 winter season including the creation of the MART; and the remainder implemented either for the 2011/12 winter period or incorporated in the retendering of the next trunk road maintenance contracts.

5. MANAGING THE RESPONSE

Building Scotland's transport resilience to the consequences of severe weather has always been at the heart of our winter planning. Our collective experience of the last few winters has however, brought the issue of partnership working into sharper focus.

5.1 MART Key Partners

As a direct consequence of the events on Scotland's road and rail networks on 6 December 2010, and the subsequent lessons identified from this event, Transport Scotland and key partners created the MART. MART is made up of representatives detailed below and representation at each event is individually assessed based on the nature and scale of the event:

- Transport Scotland;
- Police Scotland;
- Traffic Scotland;
- Trunk Road Operating Companies
- Design, Build, Finance and Operate (DBFO) Contract Providers;
- Met Office;
- First ScotRail;
- Network Rail;
- Society of Chief Officers of Transportation in Scotland (SCOTS);

- Bridge Authorities;
- Road Haulage Association (RHA);
- Freight Transport Association (FTA); and
- Confederation of Passenger Transport (CPT).

The MART contributes to the overall resilience response locally and nationally to provide up-to-date detailed information on issues across the transport network as illustrated in figure 2 overleaf.

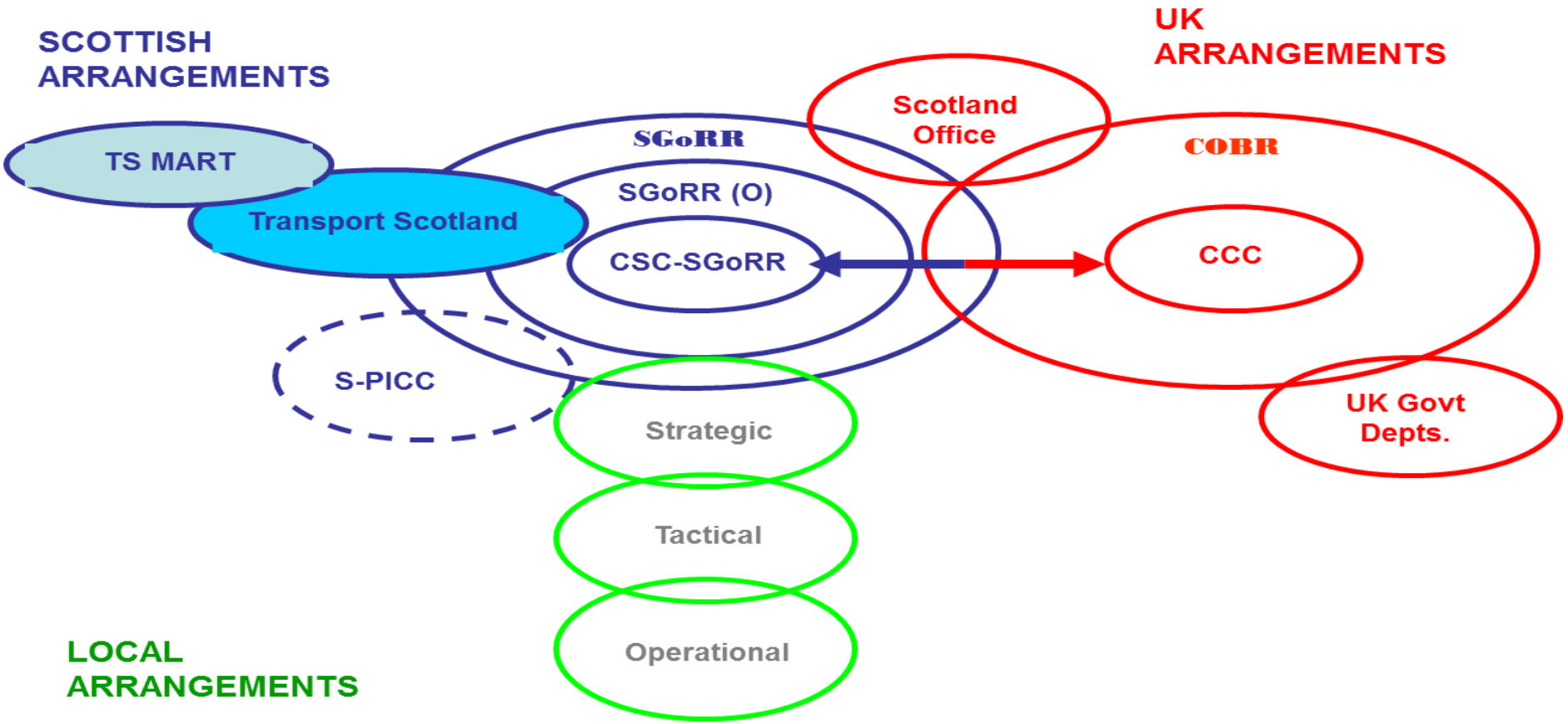

Figure 2 - Response Structures Overview

Key:
MART – Scottish Multi Agency Response Team
SGoRR – Scottish Government Resilience Room
CSC – Cabinet Sub-Committee
S-PICC - Scottish Police Information and Co-ordination Centre
COBR – Cabinet Office Briefing Room
CCC – Civil Contingencies Committee

5.2 What does MART do?

MART enables a strategic overview of event and incident handling on behalf of all the organisations involved. The existing well-defined relationships between the partners will continue to deal with the incident-specific command and control.

Figure 3 – MART in operation

The MART can be activated for both planned and unplanned reasons:

Planned

- Inter/national, large events such as Olympic events in Glasgow, the 2014 Commonwealth Games, the 2014 Ryder Cup;
- Sensitive dates for commuting such Christmas and New Year's Eve and the return to work Monday after New Year.

Unplanned

- Events will have a high risk of severe disruption to journeys with potential safety risks for the travelling public or significant potential impact for large parts of the strategic transport network such as severe weather, or the consequences of;
- Events that require a multi-agency response such as fuel supply issues, possible or actual pandemics, terrorism etc.

5.3 How does MART work?

The MART co-ordinates the flow of information both between agencies and to the public. It is a joint decision to activate the process by Transport Scotland and Police Scotland; and needs the agreement of both organisations to be set up. A Met Office representative also works in MART to ensure that any changes to the severity or areas affected by severe weather can be updated and provided to the public.

The objective of the partners is to prepare, respond and recover from disruptive events adversely impacting the transport network. Preparation and planning in advance are vital to an effective response to, and recovery from, the impact of severe weather.

Transport Scotland working in partnership with the Police Scotland has redeveloped a severe weather information strategy to warn and inform road users when significant disruption to the road network is expected during extreme weather.

The advice and information service will commence when NSWWS issues alerts or warnings within Scotland. Forecast information will be provided in advance and during of any severe weather event.

The travel advice will relate to four specific stages which will be adopted depending on the severity of the weather.

- **Normal operations** - No severe weather
- **Travel with caution** - Police are advising people that conditions for road travel are hazardous and drivers should exercise extra caution
- **High risk of disruption for road journeys** - Police are advising that conditions for travel are extremely poor and there is a high risk of disruption for road journeys. Travellers are likely to experience significant delays
- **Avoid travelling on the roads** - Police advise drivers to avoid travelling on the roads. Travellers will experience severe delays of several hours or more.

This advice will be provided to road users through Transport Scotland's network of communication tools and technologies to help them play their part during extreme weather events.

Bringing together those responsible for managing the transport response to severe winter weather in one location allows responders to share the latest information on conditions and actions thereby allowing their respective decision making to be made with the best available information. The common information picture supports consideration of strategic impacts of local conditions or decisions and additional support or mutual aid can be appropriately directed at both the local and national level.

The MARTs focus is on:

- Bringing together those responsible for managing the response to severe weather on the key transport networks in one location;
- Sharing a common informative picture of incidents;
- Improving the decision making of each partner;
- Supporting mutual aid provision; and
- Providing accurate and timely information to the travelling public and businesses.

5.4 Location of MART

The MART is physically based at the Traffic Scotland National Control Centre (map below) and will only have partners involved that are relevant to the expected impacts. The MART can also operate both in conjunction with the Transport Scotland Resilience Room (the Transport Scotland/Scottish Government/Ministerial interface) and by itself.

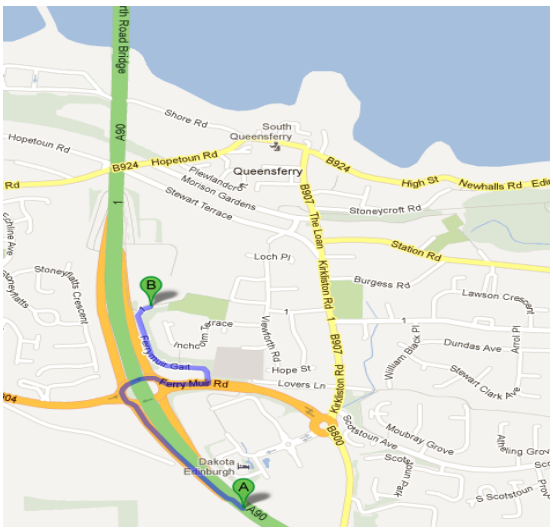

Figure 4 – Location of Traffic Scotland National Control Centre


Figure 5 – Traffic Scotland National Control Centre (TSNCC)


Figure 6 – Official Opening of TSNCC

5.5 Transport Scotland Resilience Room

The aim of the resilience room within the TSNCC is to keep the Transport Minister, Cabinet Secretary & Scottish Government Resilience Room (SGoRR) (Officials) informed of issues, their nature and mitigation.

The TS Resilience Room provides briefings directly to the Scottish Ministers and a Situation Report to SGoRR on severe winter event transport impacts which allows the

Government to make strategic resilience decisions across sectors. SGORR (Officials) comprises of central government officials from across all departments such as Health, Education, Tourism and Resilience as detailed in figure 2 above. It reports to Cabinet Sub-Committee from Resilience (CSC-SGORR) which is elected Cabinet Secretaries in the political administration.

The TS resilience room structure mirrors the SGoRR (Officials) approach:

- Strategic Lead
- Operational Lead
- Operational Support
- Briefing Manager
- Admin Support

- *24/7 On Call Duty Officer
- (& Strategic Lead over Winter)

Figure 7 – Resilience room in operation (previous TSCC)

6. DECISION MAKING & TREATMENT

Winter storms will cause disruption on our roads. No road authority can guarantee to keep roads free from ice or snow. With the actions we have taken and with people planning ahead, together we can get Scotland moving again.

- There were 183 trunk road gritters/ploughs for Scotland's Motorways and trunk roads in winter 2012/13 and this maintained the level of frontline/reserve plant provided the previous winter and represented a 10% increase from the start of winter (2010/11).

The Operating Companies (OCs) manage and maintain the trunk road network on behalf of Transport Scotland with the network currently divided into four units. During the winter service period the OCs are proactive in improving treatments and decision making and maintain close liaison with Transport Scotland.

Following the events of 6 December 2010 Transport Scotland took a range of actions to improve resilience. Our response to severe weather escalates in the following manner:

- Daily Winter Action Plans are completed by the OC and made publicly available on the Traffic Scotland website. The information goes live at 3pm each day following receipt of the forecast. The action plan information tells the public where the salt spreaders will be at what time and how much salt they will be spreading.
- Routine weekly winter teleconferences are held with Transport Scotland and the OCs every Wednesday at 3pm to review salt and alternative de-icer supplies, actions and experiences within previous 7 days and to date, weather forecasts (24 hour and 5 day), weather sensors update (faults, maintenance and improvements), statistics, mutual aid; and current/forecast pressures and concerns.
- Escalation to daily winter calls ahead of more severe weather; being joined by Met Office and Police Scotland, as required.
- With advice from the Met Office typically regarding a new weather warning across a wider area, Transport Scotland and Police Scotland agree activation from the TSNCC.
- Mobilisation within one hour or ahead of forecast period of disruptive weather. MART will operate 24 hours until period of risk has passed with membership as required by nature of the events.
- Transport Scotland Resilience Room is typically manned to provide MART with instructions and to provide Situation Reports to SGoRR and brief Ministers as required.

With OC representatives working from the MART they are able to monitor affected winter operations within their unit and advise their own individual Control Room of the wider situation. Winter Service Patrol vehicles throughout Scotland use an encrypted digital radio communications system known as Airwave. The OC utilises this equipment as a dedicated communication system between Winter Service Patrol personnel, the Traffic Scotland Control Centre, the Winter Service Duty Officer and the police. By being co-located with the TSNCC the OCs and Police Scotland can liaise and communicate directly with the drivers of the Winter Service Patrol vehicles via Airwave to establish real time conditions and coordinate the impact of incidents and call upon additional support if required.

7. COMMUNICATION WITH THE ROAD USER

7.1 Communication with the Road User

One of the major lessons learned from winter 2010/11 was that information to the travelling public needs to be clearer and more specific about the risks of travelling in severe weather. Ensuring that service providers, partners and the public have up to date information is crucial to allow informed decisions to be made at the local/service level, to confirm the overall situation is understood, and additional support can be appropriately directed at both the local and national level.

Effective communication with the public and between responders becomes more challenging in a dynamic situation but at the same time, must remain effective.

This must include communicating;

- In advance to highlight the potential impact of weather on transport operators, businesses, communities and individuals, and steps that can be taken to minimise this;
- Messages which are consistent at both national and local level, by sharing them at the earliest opportunity; and

- Up-to-date information about the latest impacts or consequences, together with advice to audiences such as employees; partners; media; customers; volunteers; other operators/service providers; and the public.

The MART promotes better awareness of the impact of weather conditions and associated hazards.

The MART allows better and more efficient communication between responders. Being co-located with the new TSNCC at South Queensferry it is best placed to get accurate and live travel information broadcast to the public. Working together in the TSNCC the MART partners provide live information to the public, businesses and media; and do so by a variety of methods accessible to the respective audiences, maximising the use of technology.

Traffic Scotland has deployed multiple platforms to inform users. These include Variable Message Signs (VMS), the Traffic Scotland desktop and mobile websites, smart phone applications, RSS feeds, Twitter, a dedicated call centre, national, local and commercial media and a streaming internet radio service. These platforms enable us to maximise our reach to road users to deliver warnings in a timely fashion so they can make informed journey planning decisions at the local level and protect their safety. Details on each of the above platforms are as shown below:

- The Transport Scotland website pages on Winter Service set out clearly to all stakeholders how we keep the trunk roads free from ice and snow. It provides information on weather forecasting, winter decision making, the winter fleet and treatments and how we communicate with the road users.
- The Traffic Scotland website continues to evidence substantial year on year growth particularly handling significant spikes in demand during extreme weather conditions but also during periods of “normal running” throughout the year.
- The Freight Scotland website was retired with effect from 17th April 2013 and its content integrated into Traffic Scotland to provide a one stop shop for all traffic related information.
- Trunk road weather sensor station data is also available to let people know just how wet, cold and windy it is at different locations all over the country. The actual weather condition data from our sensor sites complements the forecast information already provided to allow people to plan their journeys.
- The Traffic Scotland Twitter account has 34,000 followers.
- Traffic Scotland Internet Radio was launched in November 2011 and is growing in popularity. With full control over the content, from the Traffic Scotland control room, we are able to feed people near live information about on-going incidents.
- Embedded within the TSNCC Traffic Scotland host Inrix who provide the majority of the traffic and travel radio reports for commercial and local radio stations in Scotland.
- Mobile Apps (iPhone, Android, Blackberry and Windows 7 platforms and soon to be launched on Kindle Fire) and social media provide timely and more specific traffic information to users on a device they have with them and have shown significant growth in the past year. There have been over 312,071 Mobile Apps downloads since 18 November 2010.

- The Traveline Scotland website has seen the actual number of unique visitors increase and the total number of total contacts across all platforms increase by 32% compared with 2011.
- There has been a 35% decrease from 2011 to 2012 in average calls to the Traveline Scotland Call Centre. This partly reflects the continuing shift of users accessing information from mobile apps and the Traveline Scotland website.
- There are currently 197 Variable Message Signs (VMS) 197 signs available on the network.
- There are 363 Traffic Scotland cameras available to manage and monitor the network. Traffic Scotland website has a total of 255 Live-Eye-View cameras. They are made up of:
    - 134 Weather station cameras (fixed view)
    - 88 Pan, Tilt and Zoom cameras
    - 33 Rapidly deployable cameras (Pan, tilt and zoom)

7.2 Case Study

A full multi-agency response was activated as a result of the severe weather which affected parts of the west of Scotland on 22 March 2013, leaving parts of the country without power and with snow drifts of up to 20 feet in places. The affected areas were parts of Dumfries & Galloway, Kintyre and the island of Arran. SGoRR (Officials) was activated and continued to meet until 29 March 2013.

The incident was primarily mitigated by the early escalation of the weather warnings via daily/weekly calls developing to the amber warning; and this information was provided to service providers, partners and the public at the earliest opportunity to allow informed decisions to be made.

With the knowledge provided by the early weather warnings the OC was able to programme adequate resources and the provision and position of the relevant equipment on standby. As the magnitude of the severe weather increased and requests from responders; the MART facilitated mutual aid requests to provide additional resources and equipment to assist with snow clearing operations. Communication tools and technologies detailed in Paragraph 7.1 were used to maximise the use of social media to share information on conditions, actions and advice.

Despite best efforts snow drifts inevitably closed many roads; however, the early escalation of the weather warnings and efforts of all parties were acknowledged by members of the public and no complaints were received with regard to the delivery of a winter service.

A severe weather strategic leaders wash-up meeting was held on 9 May 2013 following the most significant snow event of the winter. This was across sectors and was organised to complement but not to duplicate the local/regional debriefs which have taken place. The purpose of the wash-up was to bring together key strategic leaders in the response to capture the successes and share best practice.

The aims were to:

- Review partnership working and overall response;
- Celebrate successes so that this can be shared with staff and the wider resilience community and to inform best practice;

- Identify improvements which may inform the new response structures; and
- Agree appropriate actions.

Overall it was a very open and frank sharing of lessons, testimony perhaps to the relationships which have been established over recent years.

Key actions identified included:

- Review resilience of Operational Communications – becoming more creative around options, such a VOIP phones, battery powered radios, etc.
- Make "Ready for Winter" campaign more real.
- Consider use of local radio (and wider – e.g. Northern Ireland) to communicate with the public (All partners)
- Consider magnetic livery for volunteers' vehicles.
- Ensure insurance cover for the Voluntary Sector through Police Scotland.
- Continue to improve engagement with and information flow from landline and mobile operators in particular in relation to BT Open-reach fault information on lines between exchanges and customers.
- Investigate the resilience of Airwave sets.
- Consider developing SGoRR (Officials) meetings guidance.

8. PERFORMANCE MEASURES/ADDED VALUE

There are a number of ways to measure the performance and value added of the MART to severe weather challenges.

8.1 Travel Warning Messages

The new travel warning messages resulted in a reduction of 20% of traffic on the trunk road network on 8 December 2011. The road freight and bus industries were supportive of the new travel warning messages, and communicated them to their members.

8.2 Collaborative Working

A solid, professional and supportive partnership has been established with excellent links to both Police Scotland and the Met Office and greater, positive dialogue and information sharing with the Road Haulage & Freight Transport Associations and Confederation of Passenger Transport (CPT). In March 2012 these relationships were reinforced at a Road Incident Summit organised by TS. All the key players attended, received presentations and took part in workshops looking to improve dealing with such incidents.

8.3 Virtual MART

The use of conference calls ("Virtual MART") has proved useful both during pre-planning of events, such as the high winds on 8 December 2011 and 3 January 2012, but also ahead of SGORR (Officials) meetings. They allowed all parties to hear a common picture, identify issues and actions.

8.4 MART Debrief Case Study

Following a MART debrief of OCs on 18 January 2012, Rail colleagues obtained feedback from both Network Rail and Scotrail on their experiences. These sessions identified a

number of development opportunities such as improved email circulation lists. The main lesson was a need for better sharing and communication of information between the MART and the Resilience Room; and technical solutions are being considered to improve information-sharing.

8.5 MART Activation Exercise

After the move of the Control Centre to Queensferry, a MART activation exercise was implemented on 3 May 2013 with the trunk road Operating Companies and Traffic Scotland Operations and Infrastructure Services (TSOIS) MART Partners requested to provide a MART representative to the TSNCC in South Queensferry.

The aim of the exercise was to test the operational performance of the OC and Traffic Scotland Operator Mart members within the new centre. The exercise consisted of a mock weather scenario around an amber warning for high winds and heavy rain was presented to the MART to allow testing of reporting and communications.

The key outcome of the exercise was the unfamiliarity of the OC Representatives with the building layout, facilities and technologies of the new TSNCC. OC training has been implemented to resolve these issues and improve the function and capabilities of the MART.

9. IMPROVED RESILIENCE

The overall benefits to resilience from the creation of the MART are evident in the fact that partners' communication, response and recovery processes are greatly improved providing significant resource benefits which can equally be translated into economic terms.

A close, collaborative environment has supported the development of road travel weather messages. TS Comms colleagues have combined this with the Met Office view, and that of the Minister, to produce a standard public press release which gives a harmonised view of the situation and advice to the public.

In overall terms the introduction of the MART approach, including joint planning has provided wide ranging benefits to those who operate, manage and use our transport networks. Crucially the main beneficiary is the travelling public in Scotland as a result of improved service provision.

In summary, the MART has improved Scotland's collective resilience to severe winter weather and could act as a model structure for resilience arrangements in other countries.

REFERENCES

No references have been made in this paper.