Improvements and Impact on Emergency Response Times

Gail Bester & David Reed
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- ORS Units Functional Responsibilities
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• Traffic incident management programmes have demonstrated benefits in improving mobility, safety, efficiency, productivity, energy and environment, and customer satisfaction.

• Traffic incident management programmes make use of a variety of technologies to successfully detect, manage, and clear traffic incidents.

KEY TO AN EFFECTIVE PROGRAMME: Toolbox of strategies/interventions, which cross cuts through:

• Political/Policy level
  • Political support in the form of policy and top-level management support for IM-focused objectives

• Institutional level
  • The Institutional cooperation, understanding and collaboration need to be in place for an effective programme

• Functional level
  • The functional elements need to be implemented in the form of new services, standardized procedures and communication protocols

• Technological level
  • Technology tools can support real-time monitoring and faster response to freeway incidents
EXAMPLE OF POLICY INTERVENTIONS

• In the U.S. 49 states implemented at least one of these laws – only 24 have implemented all three.

  • “Quick Clearance” – *quickly removing any vehicles* involved in an incident from the scene to maintain mobility along the roadway

  • “Move It Over” – the motorist is to *move to another lane* or slow down when approaching responders/tow trucks/public safety (police, fire) to provide a “safe zone”

  • “Remove it” – *motorists move vehicles out of the travel lanes* following a minor, non-injury incident –where information is exchanged
INTERNATIONAL TRENDS & BENEFITS

• The most significant findings of traffic incident management programmes; ability to reduce the duration of traffic incidents, most studies findings recorded savings between 30 to 40 %.

• Service patrol in Hampton Roads, Virginia, decreased the average incident duration by 70.7 percent.

• Service patrol in Northern Virginia on average decreased incident duration by 15.6 percent for crashes, 25 percent for roadway debris, and 17.2 percent for breakdowns.

• A San Antonio, Texas deployment of VMS, combined with an incident management programme, resulted in a 2.8 % decrease in crashes.

• The Coordinated Highway Action Response Team in Maryland reduced incident duration and related secondary incidents by 29%.
• National Road Traffic Act, 1996 (Act No 93 of 1996) deals with accidents and accident reports. The **scope of this chapter was extended to also cover Incident Management Systems through an Act amendment** by making an empowering provision and referring to the IMS Policy as one of the schedules to the NRTA.

• Addition to section 62A “**Response to road incident**”.

62A In the event of a road incident, the emergency services shall immediately respond to the incident and render all the necessary services in compliance with the Incident Management System Policy.......
• 40% of the vehicle population in GP

• Traffic flows in excess of 200 000 ADT on sections of the Gauteng Network

• Misalignment of road infrastructure and land use development

• Understanding its mandate not only as a Road Infrastructure implementer but a NETWORK OPERATOR, SANRAL implemented the ORS unit
OBJECTIVE OF THE ORS SERVICE

• Improve safety for motorists (particularly in the event of a crash);

• First line response to crashes and incidents on the network providing:
  • Initial scene safety
  • Initial critical emergency medical treatment

• Providing real time on-scene traffic conditions to the Traffic Management Centre(TMC) and disseminated to road users

• Assisting traffic authorities, medical response units and other emergency services in effective scene management

• Reduce the impact of incidents on the flow of traffic through quick response and quick clearance preventing any occurrence of secondary incidents.
SANRAL ON-ROAD SERVICES (ORS)

• The SANRAL On-Road services is implemented on Gauteng Freeway Network

• The service comprises of **FOUR TYPES OF SERVICES:**
  • 10 Incident Response Unit (IRU)
  • 6 Medical Response Unit (MRU) and 6 Motorcycle Medical Response Unit (MMRU)
  • 10 Light Towing and Recovery Unit (L-TRU)
  • 8 Heavy Towing Recovery Unit (H-TRU)

• Operating on 220km of Gauteng Freeway Network

• Units are deployed at 10 Satellite Centres on the e-toll network

• Service Operates 24/7/365

• The Units are dispatched from SANRAL Traffic Management Centre (TMC)
ROAD INCIDENT MANAGEMENT

Reducing the Incident Timeline, saves lives and reduces the impact of incidents.

Crash happens --- Traffic flow disrupted

Crash reported

Emergency Services dispatched

Arrive on scene

Leave scene

Traffic flow back to normal

Life

Death

Minimise Road

User Costs
## ORS Key Performance Indicator (KPI)

<table>
<thead>
<tr>
<th>Function</th>
<th>Performance Measurements</th>
<th>Target</th>
<th>Measuring Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM-3</td>
<td>Incident Detection – timeliness</td>
<td>&lt;= 3min</td>
<td>Time from occurrence of incident to creation of new (unconfirmed) incident on user interface by TMO, irrespective of means of detection.</td>
</tr>
<tr>
<td>IM-4</td>
<td>Incident Verification - timeliness</td>
<td>&lt;= 2min</td>
<td>Time from detection to verification.</td>
</tr>
<tr>
<td>IM-5</td>
<td>Incident Notification – timeliness</td>
<td>&lt;= 2min</td>
<td>Time from verification to notification of each service, averaged over all notifications, measured monthly.</td>
</tr>
<tr>
<td>IM-6</td>
<td>Vehicle dispatch - timeliness</td>
<td>&lt;= 3min</td>
<td>The time the dispatcher contacts (allocate vehicle on CAD system which sends a message to the NAVMAN on-board system) the on-road service driver and notifies him/her of an incident.</td>
</tr>
<tr>
<td>IM-12</td>
<td>Towing (light) – timeliness</td>
<td>&lt;= 11.1min</td>
<td>The time it takes from the moment the vehicle was successfully dispatched up to the arrival at the scene.</td>
</tr>
<tr>
<td>IM-13</td>
<td>Towing (heavy) – timeliness</td>
<td>&lt;= 17.0min</td>
<td></td>
</tr>
<tr>
<td>IM-14</td>
<td>Incident Response – timeliness</td>
<td>&lt;= 7.4min</td>
<td></td>
</tr>
<tr>
<td>IM-15</td>
<td>Medical assistance - timeliness</td>
<td>&lt;= 8.4min</td>
<td></td>
</tr>
</tbody>
</table>
ORS Units
Incident Response Unit (IRU)

• 10 x IRU Units

• Crew consisting of:
  • 1 Traffic Safety Officer
  • 1 BLS Paramedic
  • 2 Flagmen

• Secure incident scene

• Deploy warning signs

• Offer basic life support medical assistance, staff are registered with the HPCSA
Medical Response Unit (MRU)

- **6 x MRU Units**
- Dispatched to all crashes
- Provide rapid medical response
- Staffed by Intermediate Life Support registered with HPCSA
- Provide first line critical patient care until ambulance arrives on scene
Motorcycle Medical Response Unit (MMRU)

- 6 x MMRU Units
- Provide rapid medical response
- Intermediate Life Support paramedics registered with HPCSA
- Provide patient care until ambulance arrives on scene
- Motorcycles are provided to enhance agility of the service
Light Towing Recovery Unit (L-TRU)

- 10 x L-TRU Units
- Rollback (flatbed) type vehicle
- Move stalled or stationary vehicles or stranded vehicles out of the roadway to a place where it won’t pose a danger or obstruct the flow of traffic
Heavy Towing Recovery Unit (H-TRU)

- **8 x H-TRU Units**

- Heavy vehicle capable of moving large trucks and busses

- Move broken down vehicles or stranded vehicles out of the road way to a place where it wont pose a danger or obstruct the flow of traffic
TMC Procedure

DETECTION / VERIFICATION
ATMS / CAD

MOBILIZATION
ATMS / CAD
Traffic Authorities

ON-SCENE MANAGEMENT
ATMS / CAD

NOTIFICATION

GP TMC

POST INCIDENT

CLEARANCE
ATMS / CAD
Automatic Vehicle Location (AVL) and Tracking

- Vehicles are tracked, monitored and dispatched from the TMC, responding from various base locations throughout the network.

- Driver tag system providing user access rights on vehicles.

- Monitors driver behaviour like:
  - Speeding
  - Excessive Idling
  - Harsh Acceleration and Braking
Computer Aided Dispatch (CAD) / NAVMAN

- Unit location identified using the AVL
- Units dispatched and responses monitored using CAD/NAVMAN system
Freeway Network Coverage
Freeway Network Coverage

- 220 km of Gauteng Freeway Network
- Units stationed at 10 SANRAL e-toll customer centres (Satellite Centres)
  - Rigel SC
  - Central Operations Center
  - Rivonia SC
  - 14th Ave SC
  - Golden Highway SC
  - Kliprivier SC
  - Grey SC
  - Modderfontein SC
  - Jet Park SC
  - R21 Engen North SC
Stakeholder Cooperation

- Co-operation between the various emergency services is critical to ensure that the objectives of this service is met.

- In Gauteng, the following agencies are collocating within SANRAL’s TMC:
  - EMPD
  - JMPD
  - TMPD
  - GP Traffic
Regulation 320

- **R320. Vehicle left or abandoned on public road**
  - Any vehicle standing on a public road in a position or in circumstances which in the opinion of a traffic officer, is likely to cause danger or an obstruction to other traffic on such road, may be removed forthwith to a safer place by any such traffic officer or person or authority instructed by such officer to remove such vehicle and in the case where such a vehicle was carrying persons which is left stranded at the scene when the vehicle is removed to a Government facility, the traffic officer concerned may arrange and contract with any other person to provide the necessary transport to such persons: Provided that such traffic officer or person or authority shall, in removing such vehicle, use such device or devices as may be necessary, having regard to the public safety.
Towing vs Recovery

Towing (We do)
• Where a Vehicle is stationary or has been in an crash where it has remained on its wheels, the TRU will be able to hook/load the Vehicle and remove it from the network to a pre-defined drop-off spot, from where arrangements can be made to move it via the normal commercial services.

Recovery (We Don’t)
• Where a Vehicle has been involved in an crash where it has rolled over or any of its wheels have left the road surface.
• This would normally include a road closure or multiple lane closures and can sometimes take several hours depending on the severity.

When we don't dispatch
• Stationaries in the emergency lane (off-peak time)
• Congestion
• Veld fires
• Police and Military – where this is for example a road block
• Road works
ORS Statistics
KZN - No of Incidents/ Crashes per month
### KZN - Typical Incidents

<table>
<thead>
<tr>
<th>Incident Type</th>
<th>No. of Incidents</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crash</td>
<td>107</td>
<td>10%</td>
</tr>
<tr>
<td>Congestion</td>
<td>168</td>
<td>16%</td>
</tr>
<tr>
<td>Field Device Maintenance</td>
<td>8</td>
<td>1%</td>
</tr>
<tr>
<td>Fire</td>
<td>4</td>
<td>0%</td>
</tr>
<tr>
<td>Load Lost</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>Obstruction</td>
<td>10</td>
<td>1%</td>
</tr>
<tr>
<td>Pedestrians</td>
<td>2</td>
<td>0%</td>
</tr>
<tr>
<td>Police and Military</td>
<td>9</td>
<td>1%</td>
</tr>
<tr>
<td>Poor Visibility</td>
<td>3</td>
<td>0%</td>
</tr>
<tr>
<td>Road Construction</td>
<td>2</td>
<td>0%</td>
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<tr>
<td>Routine Road Maintenance</td>
<td>84</td>
<td>8%</td>
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<tr>
<td>Stationary Vehicle</td>
<td>673</td>
<td>63%</td>
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<tr>
<td>Weather Conditions</td>
<td>2</td>
<td>0%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>1073</strong></td>
<td><strong>100%</strong></td>
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</table>
GP - No of Incidents/ Crashes per month
## GP - Typical Incidents

<table>
<thead>
<tr>
<th>Incident Type</th>
<th>Number of incidents</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crash</td>
<td>342</td>
<td>17%</td>
</tr>
<tr>
<td>Congestion</td>
<td>17</td>
<td>1%</td>
</tr>
<tr>
<td>Field Device Maintenance</td>
<td>6</td>
<td>0%</td>
</tr>
<tr>
<td>Fire</td>
<td>27</td>
<td>1%</td>
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<tr>
<td>HAZMAT</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>Load Lost</td>
<td>7</td>
<td>0%</td>
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<tr>
<td>Obstruction</td>
<td>14</td>
<td>1%</td>
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<tr>
<td>Pedestrians</td>
<td>2</td>
<td>0%</td>
</tr>
<tr>
<td>Police and Military</td>
<td>20</td>
<td>1%</td>
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<tr>
<td>Road Construction</td>
<td>14</td>
<td>1%</td>
</tr>
<tr>
<td>Routine Road Maintenance</td>
<td>9</td>
<td>0%</td>
</tr>
<tr>
<td>Stationary Vehicle</td>
<td>1582</td>
<td>78%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>2041</strong></td>
<td><strong>100%</strong></td>
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</tbody>
</table>
Hotspot Maps - Crashes

Gillooly’s I/C & Geldenhuys I/C
GP - Metro Response Time - Crashes

00:20:10
00:17:17
00:14:24
00:11:31
00:08:38
00:05:46
00:02:53
00:00:00

JMPD
00:11:48
00:12:05
00:12:29

EMPD
00:18:05
00:13:40
00:12:34

TMPD
00:16:35
00:15:35

Apr-15
May-15
Jun-15
GP - Metro Response Time - Stationaries

00:12:26
00:14:23
00:13:24
00:10:45

00:23:02
00:20:10
00:17:17
00:14:24
00:11:31
00:08:38
00:05:46
00:02:53
00:00:00

JMPD
EMPD
TMPD

Apr-15
May-15
Jun-15
# ORS Stats April 2013 to August 2015

<table>
<thead>
<tr>
<th>Incidents</th>
<th>Total</th>
<th>Avg</th>
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<tbody>
<tr>
<td>IRU</td>
<td>18025</td>
<td>621.6</td>
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<tr>
<td>MRU</td>
<td>6477</td>
<td>223.3</td>
</tr>
<tr>
<td>TRU</td>
<td>6859</td>
<td>236.5</td>
</tr>
<tr>
<td>HRU</td>
<td>4893</td>
<td>168.7</td>
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</table>

<table>
<thead>
<tr>
<th>Response Time</th>
<th>Avg</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRU</td>
<td>9.0</td>
</tr>
<tr>
<td>MRU</td>
<td>8.8</td>
</tr>
<tr>
<td>TRU</td>
<td>12.4</td>
</tr>
<tr>
<td>HRU</td>
<td>17.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Priority Category</th>
<th>Description</th>
<th>Total</th>
<th>Avg/Month</th>
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<tbody>
<tr>
<td>P1</td>
<td>Life threatening injury</td>
<td>259</td>
<td>9</td>
</tr>
<tr>
<td>P2</td>
<td>Not an immediate life threatening injury</td>
<td>949</td>
<td>33</td>
</tr>
<tr>
<td>P3</td>
<td>Minor injuries</td>
<td>1618</td>
<td>56</td>
</tr>
<tr>
<td>P4</td>
<td>Casualties are deceased</td>
<td>200</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>3026</strong></td>
<td><strong>105</strong></td>
</tr>
</tbody>
</table>
### No of Incidents/Crash ORS Dispatch

#### Table of Incidents/Crashes by Month for IRU, MRU, TRU, and HRU

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>IRU</td>
<td>535</td>
<td>618</td>
<td>717</td>
<td>646</td>
<td>710</td>
<td>704</td>
<td>869</td>
<td>905</td>
<td>955</td>
<td>632.7</td>
</tr>
<tr>
<td>MRU</td>
<td>175</td>
<td>184</td>
<td>235</td>
<td>237</td>
<td>241</td>
<td>246</td>
<td>333</td>
<td>306</td>
<td>276</td>
<td>225.1</td>
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<tr>
<td>TRU</td>
<td>285</td>
<td>329</td>
<td>371</td>
<td>371</td>
<td>426</td>
<td>366</td>
<td>509</td>
<td>514</td>
<td>528</td>
<td>246.2</td>
</tr>
<tr>
<td>HRU</td>
<td>142</td>
<td>218</td>
<td>213</td>
<td>190</td>
<td>246</td>
<td>242</td>
<td>261</td>
<td>278</td>
<td>293</td>
<td>172.9</td>
</tr>
</tbody>
</table>

#### Diagram

- **Bar Chart** showing the number of incidents/crashes by month for IRU, MRU, TRU, and HRU.
- **Axes:**
  - X-axis: Months (Jan-15 to Sep-15)
  - Y-axis: Number of Incidents/Crash ORS Dispatch
## ORS First on Scene

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Crash</td>
<td>10%</td>
<td>9%</td>
<td>13%</td>
<td>10%</td>
<td>9%</td>
<td>14%</td>
<td>14%</td>
<td>12%</td>
</tr>
<tr>
<td>Stationary</td>
<td>56%</td>
<td>47%</td>
<td>61%</td>
<td>45%</td>
<td>65%</td>
<td>60%</td>
<td>63%</td>
<td>69%</td>
</tr>
<tr>
<td>Total</td>
<td>66%</td>
<td>56%</td>
<td>74%</td>
<td>55%</td>
<td>74%</td>
<td>74%</td>
<td>77%</td>
<td>81%</td>
</tr>
</tbody>
</table>

### First on Scene

- **Crash**: 10%, 9%, 13%, 10%, 9%, 14%, 14%, 12%
- **Stationary**: 56%, 47%, 61%, 45%, 65%, 60%, 63%, 69%
- **Total**: 66%, 56%, 74%, 55%, 74%, 74%, 77%, 81%
ORS Response Times in minutes

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>IRU (IM-14)</td>
<td>10.4</td>
<td>9.7</td>
<td>9.7</td>
<td>10</td>
<td>9.7</td>
<td>10.1</td>
<td>10.3</td>
<td>9.8</td>
<td>9.7</td>
</tr>
<tr>
<td>MRU (IM-15)</td>
<td>9.3</td>
<td>10.7</td>
<td>9.2</td>
<td>9.4</td>
<td>9</td>
<td>8.9</td>
<td>9.9</td>
<td>9.6</td>
<td>9.8</td>
</tr>
<tr>
<td>TRU (IM-12)</td>
<td>12.8</td>
<td>13</td>
<td>13.2</td>
<td>14.6</td>
<td>12.9</td>
<td>13.6</td>
<td>13.9</td>
<td>13.3</td>
<td>13.1</td>
</tr>
<tr>
<td>HRU (IM-13)</td>
<td>21.8</td>
<td>19</td>
<td>18.7</td>
<td>17</td>
<td>19</td>
<td>17.2</td>
<td>19.1</td>
<td>17.3</td>
<td>16.6</td>
</tr>
</tbody>
</table>
GP - Clearance Time

![Clearance Time per Injury Type Graph](image-url)

- Fatality
- Light
- Severe
- No Injury

[Graph showing clearance times per injury type from Jan-15 to Aug-15 with peaks and troughs indicated for each category.]
Conclusions

Challenges:
- Institutional Cooperation – 3 Metro areas needed for cooperation
- Performance Monitoring – Introduction of KPI’s and tracking of KPI’s, specially for responsibilities outside the control of SANRAL
- Lack of resources – E.g. Access to SAPS and Pathology Services responding to crashes. Crashes account for 20% but often results in delays of longer than 3 hours
- Cooperation and Managing of private medical, and towing and recovery services (Commercial Services)

Interventions:
- Relationship with SAPS to reduce response times
- Post incident debriefing of serious incidents to fatal crashes
- Stakeholder engagement – RIMS Structure
- Adjust KPI targets in relation to ORS fleet size

Successes:
- Reduced the average time, from occurrence to clearance by 20% to 25%
- Collocation of 3 Metro’s and Provincial Traffic in the SANRAL TMC
- Respond to over 80% of all incidents and crashes where assistance is required
- 75% of the time ORS units are the first responder
- Automated dispatching, monitoring of incident management milestones
- Real-Time traffic information
Real time Travel Time Information

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Questions

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