AN EVALUATION OF INCIDENT MANAGEMENT SYSTEMS: THE CASE OF THE BAKWENA PLATINUM CORRIDOR, NORTH WEST PROVINCE

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ABSTRACT
This paper examines and evaluates the role of a pre-planned and co-ordinated response to road incidents on the Bakwena N4 toll road in the North West Province. In light of rapidly increasing traffic volumes, concerns regarding the consequences should anything "go wrong" are addressed by using the IMS which is currently in place as a model. It is maintained that IMS plays a vital part in the sustainability of road transport in the country, but that not enough consideration is given by relevant authorities to the allocation of resources. It is felt that this is particularly applicable in the North West Province where considerable attention is being focused on traffic planning for 2010.

Shortcomings of the N4 IMS are discussed whilst highlighting benefits. Traffic and accident data is briefly summarised in order to draw attention to particular areas of concern. It is concluded that IMS should be elevated to provincial level in the North West and developed and implemented on all major routes; ensuring that it forms an integral part of transport corridors.

INTRODUCTION
In accordance with Government legislation regarding the implementation of Incident Management Systems on all national roads, the Bakwena N4 North West Incident Management System (N4 NW IMS) was developed and implemented during 2002. It has been in "maintenance and monitoring" phase for the past six years. All role players in this system are of the opinion that it is functioning well and there is a certain pride in being the only IMS in the province. In view of this and the concerns raised by increasing traffic volumes, and a subsequent increase in the number of incidents and the consequences of these, an evaluation was undertaken in order to assess the current status of this IMS and its capabilities.

The intention has also been to highlight the role of IMS as an integral part of a road transport corridor, and thus of sustainable transport; as well as to put forward the case for developing IMS on other major routes in the North West Province.
In this regard it is felt that the IMS has to be evaluated against the background of the Bakwena Platinum Corridor and the demographics of the North West Province. Therefore the first section of this paper gives an overview of these facts and looks at transport corridors and sustainable road transport.

Section 3 contains a detailed discussion of findings of the IMS evaluation, preceded by an explanation of the approach and methods used in analysis. Strengths and shortcomings are highlighted and recommendations for future development are made.

It is concluded that IMS forms an integral part of a transport corridor and thus plays an important role in sustainable road transport. In this regard more consideration to the allocation of resources by the relevant authorities is required and IMS should be implemented at a provincial level.

This study was undertaken by Tolcon-Lehumo (Pty) Ltd as the IMS consultant in conjunction with Pt Operational Services (Pty) as the toll operator and Bakwena as the Concessionaire.

BACKGROUND: THE BAKWENA N4 PLATINUM CORRIDOR IN THE NORTH WEST PROVINCE (N4 NW)

The Bakwena N4 Toll Road began its operations in the North West Province at the end of 2001. It is the first and only toll road in the province. This road, together with sections of the N1 and N4 in Gauteng, forms part of the Bakwena Platinum Highway which is the third major road transport corridor project launched in South Africa by the South African National Roads Agency (SANRAL). This route is an important transport corridor in the SADC (Southern African Development Community) region in that it links Mozambique with Namibia. Currently it is the main transport route from Gauteng Province to Botswana. Moreover, with international investment in the project, it has had a positive impact on the country's economy.

Transport Corridor

As a transport corridor, this route provides for the rapid movement of large volumes of traffic and so ensures the mobility and movement of people and products. It therefore affects the lives of millions of people and their communities, and as such has a major role to play in South Africa's economy and future development. The road structure is assured and monitored contractually according to specific international standards which also apply to any future increase in demand. In this regard Bakwena is committed to providing the maximum level of service within the constraints of topography, design and cost – thereby ensuring the best levels of safety possible. Concerns for road transportation on this route, which are discussed in greater detail in the next section, thus pertain to human behaviour and the consequences should anything "go wrong".

Sustainable Transport

In keeping with world trends and values regarding sustainable transport, the South African government has started to shift emphasis in its transportation policy and public spending and actions away from building and supply to management and demand. This goes together with growing concerns about reducing the use of non-renewable resources and increasing respect for the environment. This is reflected in the North West Province by a range of long and short-term objectives for the reduction in transport costs and the improvement in the efficiency of infrastructures.

North West Province

The North West is a medium sized province with a population of approximately 4 million people. It is predominantly rural with 54% of the land being used for agricultural economic activity, but rapid urbanisation is being experienced. The province also produces 94% of South Africa's platinum, 46% of its granite and 25% of its gold. One of the major challenges faced is a relatively inadequate infrastructure, particularly in the remote rural areas, with inherited backlogs in service delivery. This is against a backdrop of significant inequalities between rich and poor and the uneven distribution of available resources. However, considerable excitement has been generated by the 2010 FIFA Soccer World Cup, when the Province will be hosting six matches in Rustenburg. This is seen as a major window of opportunity for increased investment in the economy of the province, particularly in light of the increasing vulnerability of developing nations brought about by global economic woes.

AN EVALUATION OF THE BAKWENA N4 NW INCIDENT MANAGEMENT SYSTEM (N4 NW IMS)

The N4 NW is a 290 km stretch of road which carries, on average, 13 000 vehicles per day, 10% of which are heavy vehicles. According to the North West Province's Freight Transport Databank, approximately 400 000 tons of dangerous goods are conveyed through the Botswana border post per annum. In view of this, concerns regarding the consequences of incidents or the failure of any key component in the intricate relationship between the supply and demand of resources are increasing. For example, a 20 000 litre chemical spill would result in extensive road closure, with subsequent effects on road users, communities and the environment. In this scenario, the closest Dangerous Goods specialists are based in Pretoria, and because of distances on the N4, would take at least three hours to reach an area such as Zeerust.

Furthermore, it is expected that the 2010 World Cup will increase the demands on the capacity of the road with the influx of foreign visitors and soccer fans. It is therefore deemed to be essential that a well established IMS be ready to deal with all eventualities in order to minimise the negative primary and secondary effect of incidents, which includes costs and a negative impact on the economy. Hence it was deemed necessary and opportune to examine the strengths and weaknesses of this particular system in order to ascertain its capabilities and readiness to meet the demands of the 21st century.

Traffic Volumes and Incidents

The data for the following brief overall summary of traffic information and incident statistics was taken from the database maintained by Bakwena and is used to highlight the increase in both traffic volumes and incident fatalities on the N4 NW. This is intended only as an overview for the purposes of discussion and not as an in-depth analysis of data, which is beyond the scope of this paper.

Figure 1 depicts the daily average number of vehicles measured per month at Brits Plaza on the N4 NW. The increases in volumes shown in 2007 and 2008 reflect mainly an increase of 10% in heavy vehicle transport.

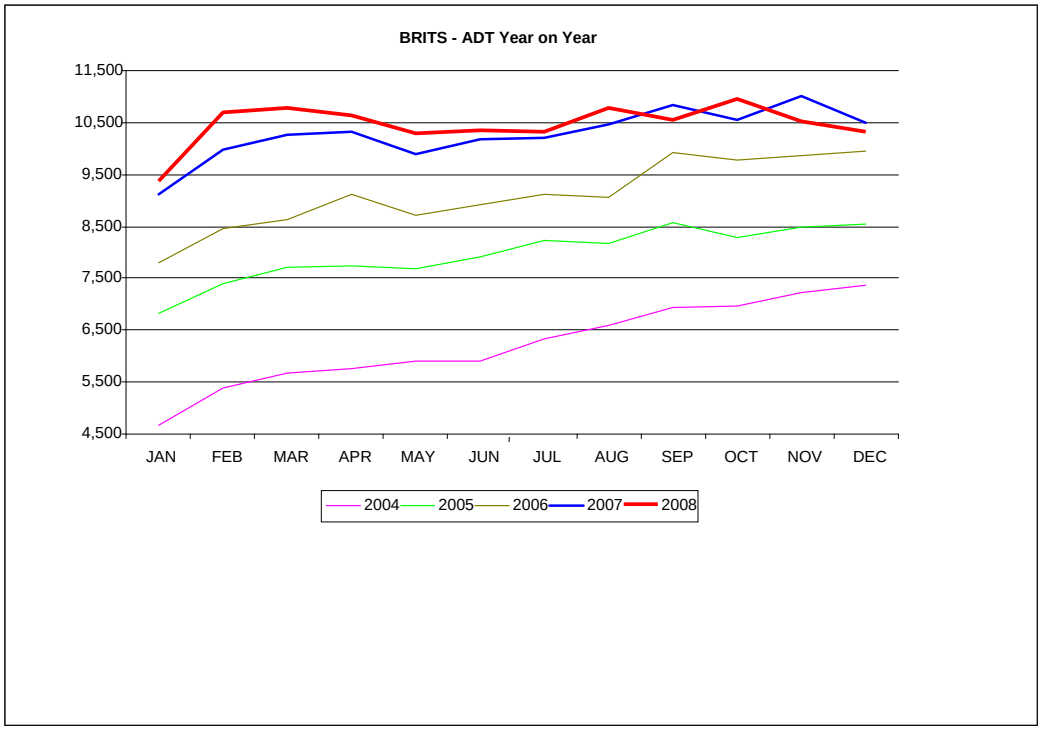

Figure 1: Annual Daily Traffic

Figure 2 shows the number of incidents and related fatalities recorded over the whole of the N4 NW on a yearly basis. Whilst there was a significant increase in the number of incidents recorded for 2008, there was a slight decrease in the number of fatalities. However, the general trend is upward. In 2007 fatalities for this route were 7% of the provincial number (920) – as per figures compiled by the RTMC (Road Traffic Management Corporation).

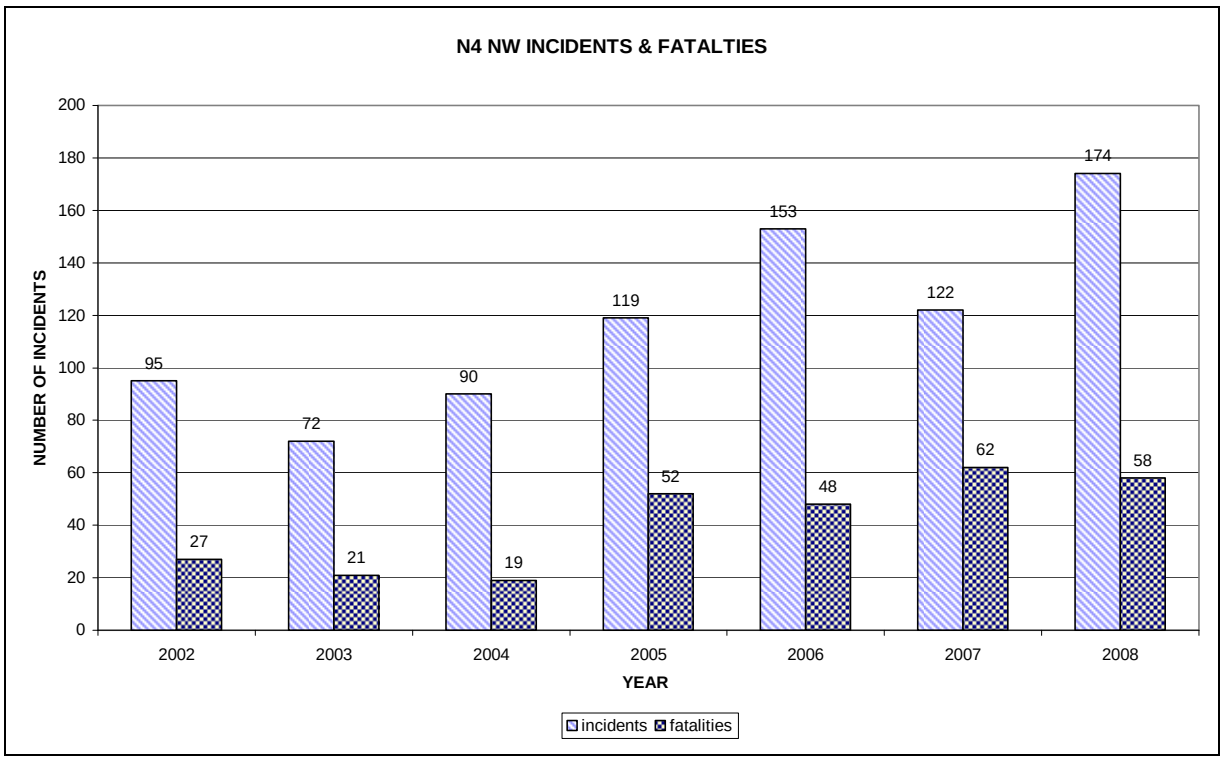

Figure 2: Incidents and Fatalities

Analysis and Approach

"Incident Management" is defined as the pre-planned and co-ordinated response to incidents, with the aim of restoring normal road capacity and safety levels as quickly as possible. An incident is considered to be anything which reduces the capacity of the road – mainly, but not exclusively, vehicle crashes. For the purposes of this discussion, only incidents where two or more services respond to the scene have been taken into account. An Incident Management System consists of all relevant role players together undertaking the planning and co-ordination. An IMS is usually established on a particular route with the role players consisting of the primary emergency services (Emergency Rescue Services, Fire Services, South Africa Police Services, Traffic Authorities) which respond to incidents on that route, together with other secondary, tertiary and auxiliary organisations (e.g. private ambulances, towing services and various government departments)

There is a certain difficulty in applying concrete measurements to an analysis of IMS, as results are largely dependent on good communication and teamwork, and are often challenging to determine. This particular system has been evaluated according to:

- the key principles of IMS - communication and on-scene co-ordination
- the structures and procedures which are in place,
- the extent to which the aims and goals of IMS in general are met

These are considered alongside the assumption that the management of an incident is a systematic process of detection, response, on-scene management, clearance and follow-up activities.

Tolcon as an IMS consultant has been involved in the development, implementation and maintenance of many IMS's in various parts of the country since 1997; including this N4 NW IMS. Hence, much of this evaluation is based on knowledge and experience and the system is measured against the procedures and protocols contained in the Guideline Plan as developed at the implementation phase. Ongoing feedback from and dialogue with all relevant role players forms the basis for observation and interpretation.

Findings:

Findings are discussed under various subheadings. These include discussion of how various challenges have been met and underscore needs which still have to be met. Detailed explanations of IMS procedures and protocols have been omitted for the sake of brevity.

Documentation and Structures:

Agreed protocols and procedures are well documented and contained in a Guideline Plan; as are alternative routes to be used in the event of road closure, and identified areas of jurisdiction. A Steering Committee consisting of representatives of all emergency services and other role players meets on a regular basis in order to "drive" the system and monitor its performance. Representation on this committee is periodically affected by restructuring and upgrading programmes within provincial government departments, but role players remain committed and a dynamic spirit of co-operation exists. Task groups are formed as and when required in order to address specific issues.

Communication:

Central to the idea of IMS is that Centralised Communication Centres (CCC's) channel all information regarding an incident. On this system, the Rustenburg Fire Department's control room is currently acting in this capacity. Unfortunately radio communication systems in the province are inadequate and outdated. This is having a negative effect on rapid response to incidents as well as communications from the scenes of incidents. More often than not, cellular telephones – also private ones - are being used instead of radios. The province is currently in the process of a preliminary assessment of its radio communications network.

Response to Incidents and On-scene Management:

Despite being hampered by poor radio communications, response to incidents is usually quick and efficient, and incident scenes are handled according to IMS principles – where co-ordination and co-operation amongst all responders is crucial. Constraints are imposed by limited resources, lack of and uneven distribution of manpower, vehicles and equipment. Added to this is an increasing loss of skills and experience due to relocation of personnel.

Some of these challenges are being met by private organisations at no extra cost to the system. The Bakwena Control Room also plays an important role in the detection of incidents as does it's Route Services.

Incident Clearance

Bakwena Routine Road Maintenance contractors assist with minor clean-ups, as do Route Services. The road and road reserve is also kept clear of debris and long grass. Hazmat specialists, assisted by Fire Departments, are used for clean-up and rehabilitation after dangerous goods incidents.

Follow-up Activities and Debriefings

Debriefings of major incidents are held when necessary in order to resolve particular issues and to serve as a valuable learning and training tool. These are held as multi-disciplinary meetings where the handling of a specific incident is discussed in a constructive manner and also serve as a means for monitoring the on-scene management of incidents. From these it has also been possible to determine training needs.

Training

IMS training is conducted on a regular basis, as is Dangerous Goods Awareness training. A concern with regards to training is that not enough ongoing refresher and in-house training is being undertaken. Ideally simulation exercises should also be held in order to test procedures in practice and serve as valuable learning exercises. SANRAL is also in the process of introducing an accredited IMS training module into training colleges.

Statistical Data:
Valuable traffic and incident data is collated by Bakwena. This helps to monitor the system and feedback in the form of annual Monitoring Reports is issued to all role players.

Traffic Law Enforcement:
Whilst traffic law enforcement does not form a part of IMS procedures, it plays an important role in the prevention of incidents. Traffic authorities are struggling with manpower shortages and a lack of funding. Bakwena is currently involved in a SANRAL Traffic Control Centre project at Bapong, which will play a major role in overload control and traffic law enforcement in that area.

2010 Readiness:
It is believed that this IMS is ready to handle the increased demand on its capabilities which will be brought about by the 2010 World Cup. However, more interaction with provincial departments involved in planning for the event is required.

Highlights and Benefits:
It is believed that most of the findings are positive and demonstrate that this is a well established and professional IMS. Despite difficulty measuring "intangibles" the following can be highlighted:

- Despite challenges and frustrations, role players continue to work with dedication and positive commitment to teamwork. Attendance at meetings is consistently high as this is the only such forum for the exchange of multi-disciplinary ideas and experiences.
- As with all IMS's, existing resources are used, hence no additional funding is required for the maintenance of the system
- The aims of IMS are being met in the rapid clearance of incidents. This in turn plays a positive role in the long term minimisation of fuel consumption and emission of carbon dioxide and pollutants into the atmosphere.
- Rapid response and clearance reduces the chances of secondary incidents and improves safety and reduces delays and the chances of more deaths and serious injuries

Challenges:
The two major challenges faced are the radio communications and resources factors. In the resources factor is included refresher and in-house training, together with the capacity for dealing with dangerous goods incidents.

<u>Recommendations</u>
It is believed that shortcomings highlighted are to be addressed at a provincial level for 2010, with allocation of funds from a national level. It is hoped by all role players in the N4 NW IMS that the results and ramifications of this will continue to grow long after the event.

It is also maintained that IMS should be considered an important part of road transport corridors, and not as a sub-section of traffic management. The handling of incidents is a task of its own and requires special skills and training In this regard, more awareness needs to be raised – both with provincial authorities and the public.

Moreover, it is believed that the successes of the N4 NW IMS should be extended to other major routes in the North West, in order that benefits may be felt by all. The N14 and the N12 are also major transport routes and as such, bearing in mind the resource factor, would be able to make far more effective use of scarce resources with adequate pre-planning and co-ordination.

With all these considerations, it strongly recommended that IMS be raised to provincial level in the North West, and that relevant structures be put in place, as is happening in other provinces – e.g. Provincial Technical IMS Committees.

Insofar as the N4 NW IMS itself is concerned, it is recommended that at this stage in its development, simulation exercises be held on a regular basis, in order to maintain standards, and form part of pre-planning.

CONCLUSION

The evaluation of the N4 NW IMS has shown that it is a well established system and that as a major factor in the reduction of incident duration – and associated effects – it should be considered an integral part of transport corridors. In this way, it contributes to sustainable transport. An important test for this system (and the province) will come with the Confederations Cup to be held in June 2009.

The North West is a proud province and Bakwena is proud to be a part of it. However, there is only one IMS currently in place, and it is believed that more attention should be given by the relevant authorities to extending this to other routes – namely the N12 and the N14, together with more consideration to the allocation of resources.

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