Safety In Mines Research Advisory Committee
Project Summary:

**Project Title:** GAP 520 Investigation of safety of rail vehicles and systems operating in South African gold mines

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**Report Date:** 20 May 2005

**Category:** Applied Research

**Summary**

The project was intended to:

- Investigate rail system accidents on South African gold mines to determine the major causes of accidents.
- Compare the South African rail system safety record with those of selected international countries.
- Recommend means of improving rail system safety on local gold mines by drawing on appropriate international technology and systems.

In order to acquire information on the causes of local accidents:

- Data from the SAMRASS report and individual accident reports were analysed.
- Interviews were held with various role players.
- Literature surveys were carried out and appropriate literature was studied in detail.
- Mines were visited to ascertain the systems in use and identify potential dangerous practices.

In order to assess the international situation:

- Accident data was acquired from selected countries.
- Standards, Codes of Practice and legislation from those countries were evaluated to determine the content of such data, which was appropriate for local use.

The findings of the project team are that:

- Local rail system accident rates are higher than those of the selected other countries. However, since mineral transport is not carried out by rail systems in those countries, the accident rates and accident causes are not comparable.
- There are currently no local standards for rail systems, although national standards for locomotive controllers and rail track are currently being prepared.
- Generally, equipment is manufactured to customer requirements.
- In general the mines and mining houses do not make use of detailed specifications for rail system equipment.
- In most cases rail equipment design has not changed much for the last 20 years.
- Rail system accidents account for approximately 10 per cent of all accidents.
- Of interest is the fact that the percentage of accidents involving rail systems has declined over the past decade. Approximately 85 per cent of rail system accidents are ascribed to some form of human error.
- Worker discipline and safety awareness is generally of a low standard, and supervisors were observed not to enforce discipline.
- The single most frequent cause of rail system accidents was coupling of vehicles.
- In terms of the seriousness and frequency of occurrence of rail system accidents the following are the most important causes in order of priority.
  1) Walking on or next to the track.
  2) Derailments.
  3) Collisions.
  4) Travelling in or on rail vehicles.
  5) Coupling.
  6) Hitting obstructions of some form.

Most of the accidents resulting from people travelling in or on vehicles, coupling and hitting obstructions are caused by human error. The cause of “human error” is however debatable.

**Recommendations:**

- Improving workers’ cognitive skills during training, in preference to rote learning.
- Requiring locomotive drivers in training to first complete a prescribed time as guards.
- Applying stricter disciplinary measures when workers, and in particular supervisors, are found to be working unsafely.
- Carrying out regular audits of the rail transport systems in the mine, focusing in particular on those issues, which result in most accidents. In this regard, observations during night shifts indicated that this is the time when conditions are at their worst.

In addition, all stakeholders should encourage their members to:

- Adhere to the Regulations and Codes of Practice intended to ensure their safety.
- Adopt a process of self-policing.
- Accept the need for, and application of, stronger disciplinary measures against offenders.
- If possible adopt a more co-operative attitude, as compared to a confrontational attitude, to promote a safer working environment on the mines.