

Department of Minerals and Energy

**Overview
of recent and pending development in regulating
rail underground,
current trends in accidents, and
future prospects**

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the dme

Department:
Minerals and Energy
REPUBLIC OF SOUTH AFRICA

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Introduction

The Commission of Inquiry into Safety and Health in the Mining Industry (Leon Commission 1995) identified haulage and transport accidents as the second largest category of accidents in mines.

In response to that;
the tripartite task groups under auspices of the MRAC developed the new, so-called DME's guideline, and revised the Minerals Act regulations,
Standards South Africa revised the relevant South African National Standards

Regulatory mechanisms - guideline

“Guideline for the compilation of a mandatory code of practice for underground railbound transport equipment”

Issued: Aug 2003

Effective: Feb 2004

Compliance with the standards: Dec 2005

Mandatory references:

Locomotive

SABS 1809: “Failsafe Underground Mine Locomotive Control Systems” and

SABS IEC 60529 “Degrees of protection provided by enclosures”

Braking system

Minimum retardation – $0,18\text{m/s}^2$

A ratio of the unbraked mass to the locomotive mass is 7:1 for gradient 1 : 200

Regulatory mechanisms - guideline

Rolling stock

The COP must address the maintenance of rolling stock to ensure it is in compliance with manufacturer's standards and design

Tracks and rails

SABS 0339:2000 "Design, construction and safe use of permanent underground rail trackwork in mines" including two normative references:

SABS 916: 1973 "Fishbolts and nuts for light rails" and

SABS 914: 1974 "Fishplates for light rails" together with amendments made in 1978, 1983, 1993, and 2000.

Regulatory mechanisms – regulations

The new regulations for the underground railbound transport under the MHSA are part of Chapter 8 “Machinery and equipment” ; regulations 8.2, 8.2(1) to 8.2(7) and 8.3

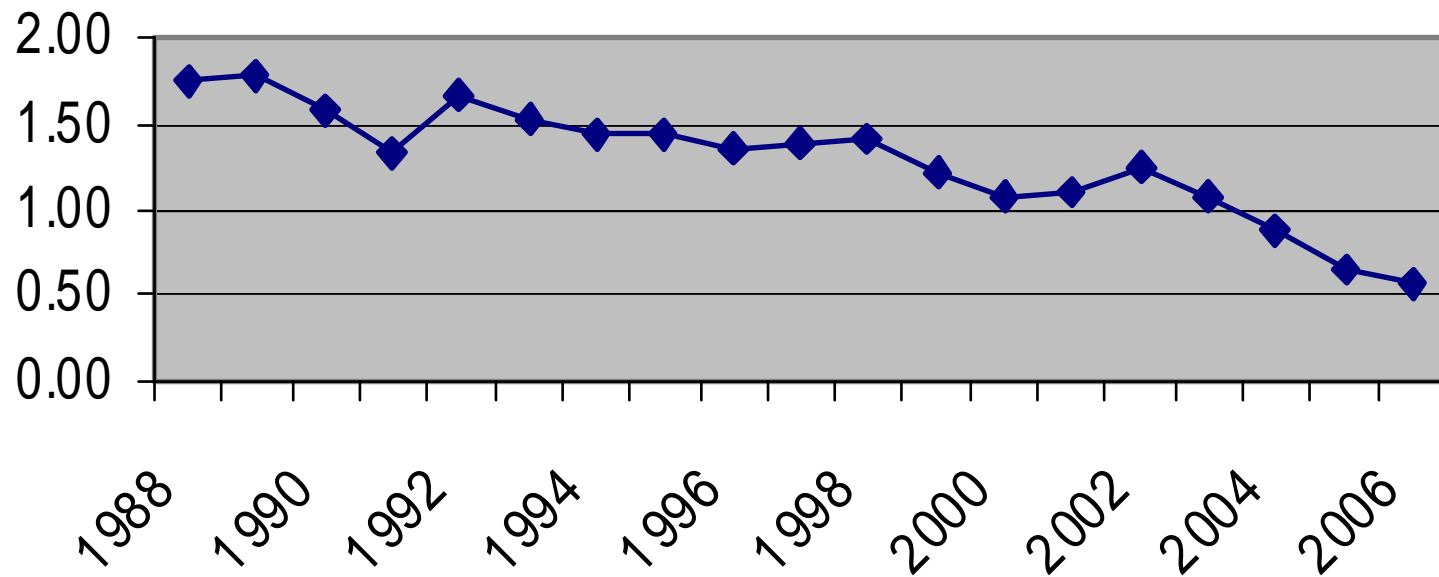
however,

there are still some regulations in Chapter 18 “Traction” under the Minerals Act, which were not repealed; example: regulations 18.3.1, 18.3.2 and 18.6.

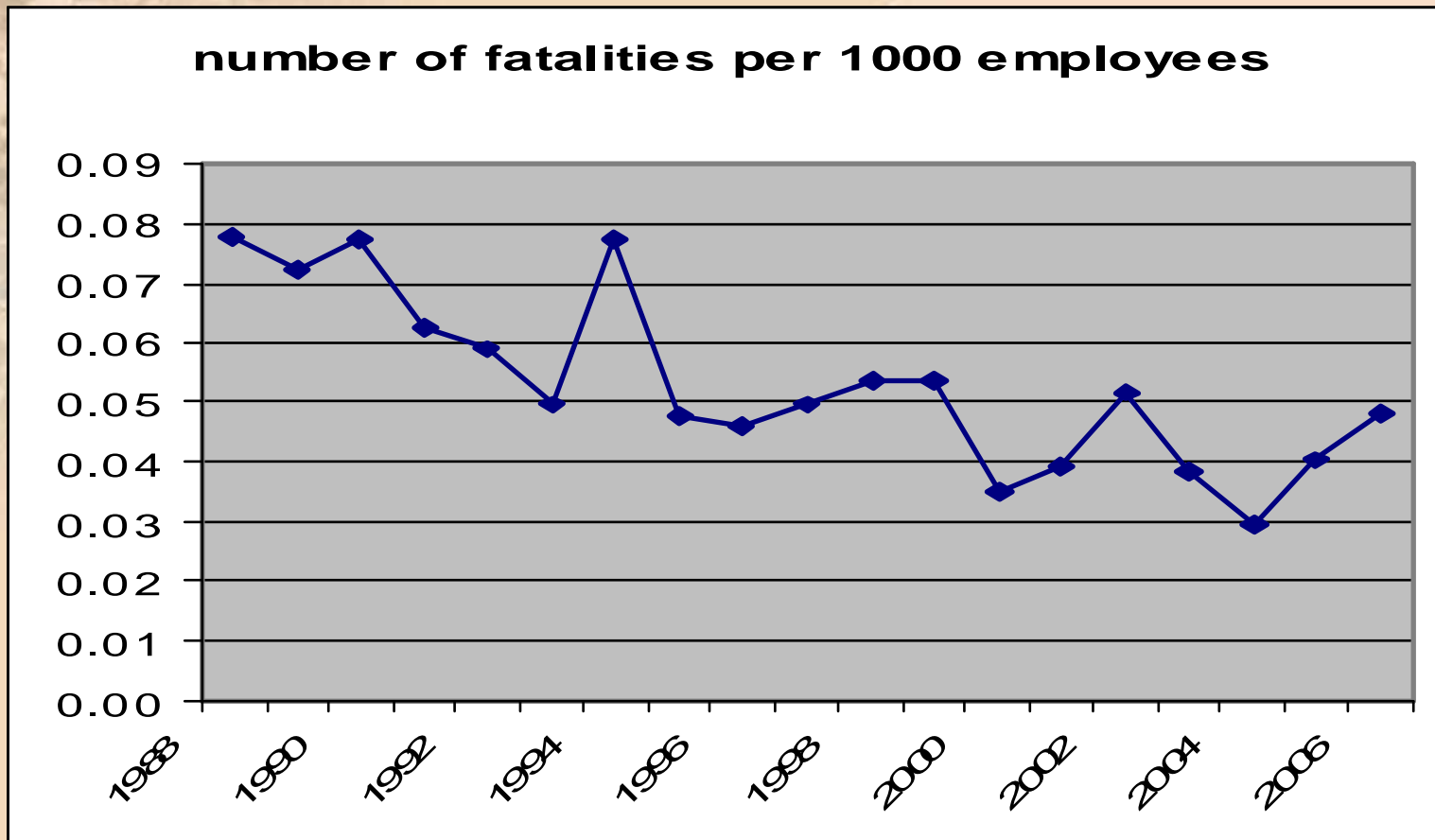
This is not a unique situation as other subjects of regulations are concern, than it has to be appreciated how complex is our present legislative situation.

Railbound transport – injuries

number of injuries per 1000 employees



Railbound transport – fatal accidents



Future prospects - considerations

Guidelines:

The requirement for braking system is that the minimum deceleration of the train is $0,18 \text{ m/s}^2$

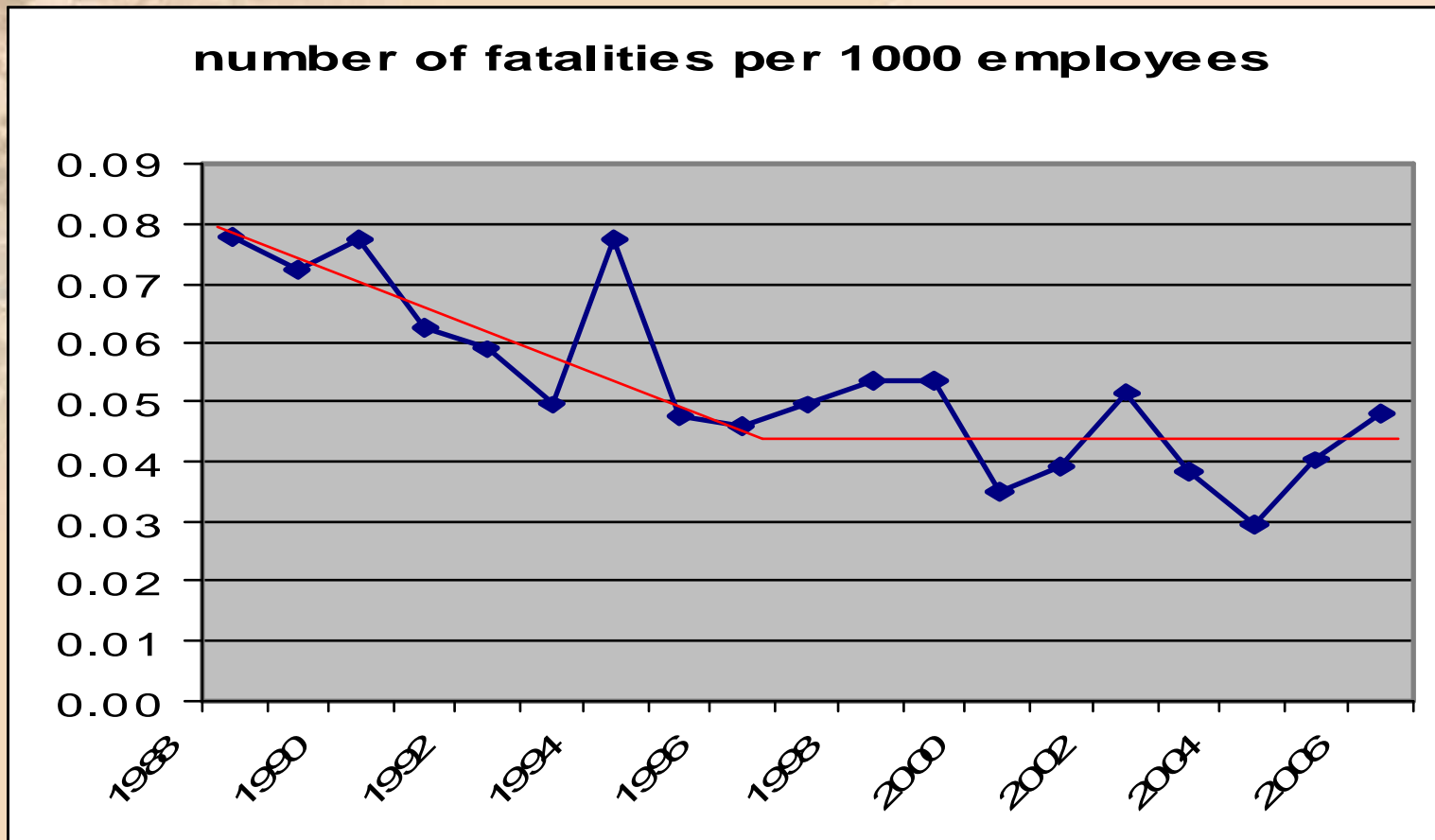
Traveling speed	Time to stop	Distance to stop
5 km/h	~8 s	~5,5 m
8 km/h	~12 s	~14 m
12 km/h	~19 s	~31 m
16 km/h	~25 s	~55 m

This table does not consider the driver's decision making and reaction times

The dynamic brake testing is only required for new design of brakes or when brakes are modified

Future prospects - considerations

Statistics



Future prospects - considerations

The recently revised South African National Standards:

Standards that probably will be referenced in the revised in future guideline:

SANS 10339: 2006 Underground rail trackwork in mines

SANS 914: 2006 Fishplates for light rails

SANS 916: 2006 Fishbolts and nuts for light rails

SANS 1809: ???? Fail-safe underground mine locomotive control systems

Informative standards:

SANS 913: 2006 Springspikes for light rails

SANS 915: 2006 Coach screws for light rails

SANS 917: 2006 Dogspikes for light rails

SANS 10354: 2006 The safe application of underground railway driven and non-driven wheel sets

SANS 10404: 2006 The design and safe use of underground mine rolling tock

Future prospects - considerations

The recently developed South African National Standards:

SANS 868-1-1:2005 Compression-ignition engine systems and machines powered by such engine systems, for use in mines and plants with explosive gas atmospheres or explosive dust atmospheres or both
Part 1-1 Hazardous locations in underground mines – Basic explosion protected engines

SANS 868-1-2:2005 Compression- ignition engine

Part 1-2 Hazardous locations in underground mines – Explosion protected engine systems

SANS 868-1-2:2005 Compression- ignition engine

Part 1-2 Hazardous locations in underground mines – Machines

SANS 868-2:2006

SANS 868-3:2006 (three parts)

SANS 868-4:2005 Compression- ignition engine

Part 4 Non-hazardous locations in underground coal mines

1 National amendment 2005-12-02

Future prospects – way forward

Creation of tripartite environment

Simrac research projects

Development of more pro-active steps
based on accident statistics

Thank you for your attention!