



**GOLD FIELDS**

AMRE SEMINAR – MAKING OUR PEOPLE WORK SAFER

## SIDE TIPPER DESIGN REVIEW FOLLOWING A KLOOF FATAL ACCIDENT

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**The complete Gold company**



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## INTRODUCTION AND BACKGROUND

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- **Why this presentation?**

- We may have a practical solution to an Industry wide problem and it will **MAKE PEOPLE WORK SAFER**

- **Incidents in Industry**

- Near misses (Ranging from dislodging from chassis, accidental tipping, mismatched buckets falling from support trunions)
- Injuries (Mostly minor)

- **Serious Incidents**

- Numerous serious injuries in the Mining Industry
- The 3 Shaft fatality

IT WORKS, .....BUT !!!!??





## 3 SHAFT FATAL ACCIDENT

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### Brief description of accident

In February this year, a Contractor performing drilling work at our No.3 Shaft, made use of a standard side tipper to transport a drilling machine to site. On arrival at the site, the machine had to be removed from the tipper.

Instead of tipping the tipper, as designed, the now deceased climbed into the tipper to assist with the off-loading of the machine.

Whilst the drilling machine was being off-loaded, the bucket locking mechanism underneath the bucket became unlatched, allowing the tipping of the load.

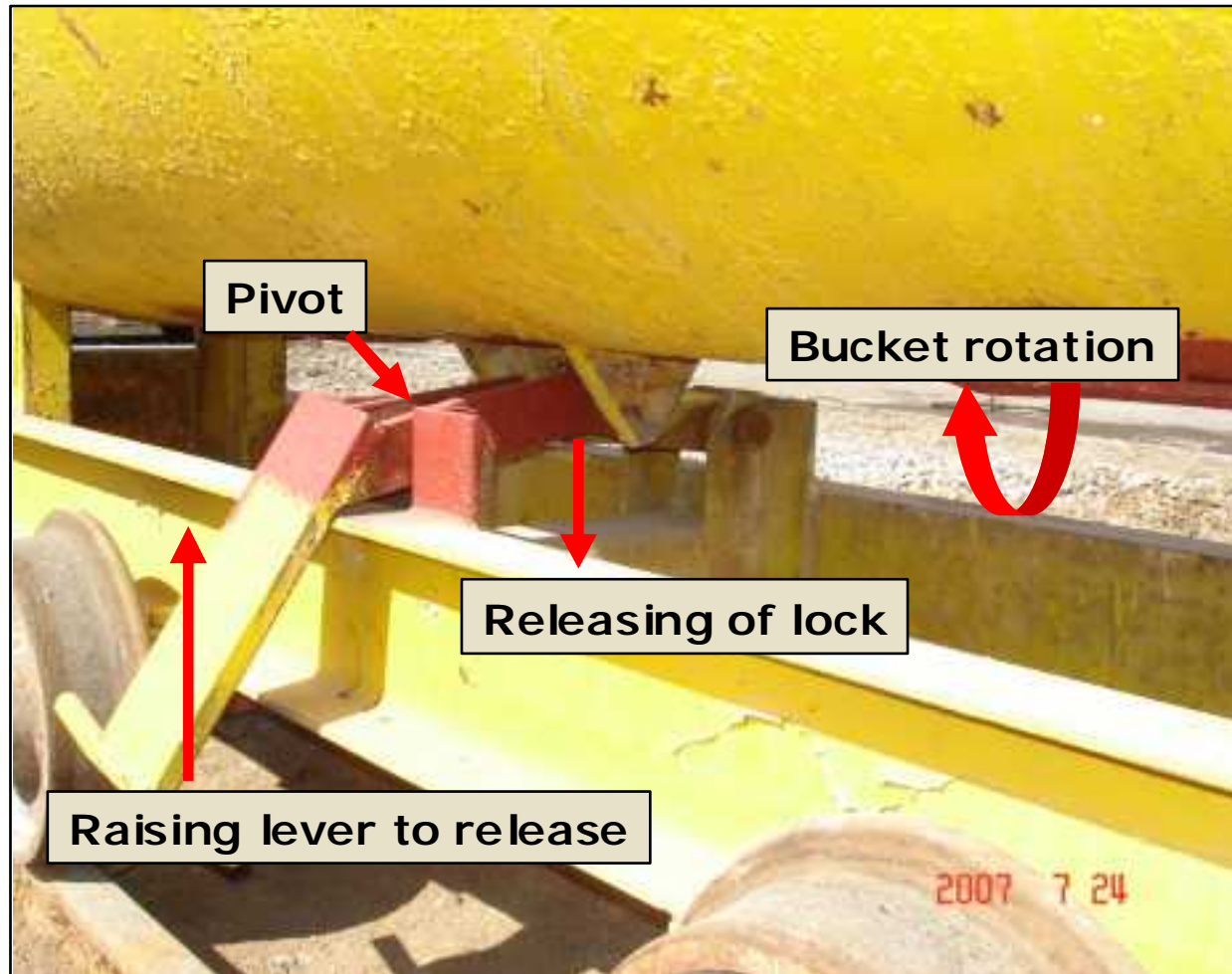
The machine pulled the bucket off the chassis and trapped the Contractor between the bucket and the footwall, fatally injuring him.

### 3 SHAFT FATAL ACCIDENT

#### Bucket locking mechanism (Dual)



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## BEHAVIOUR

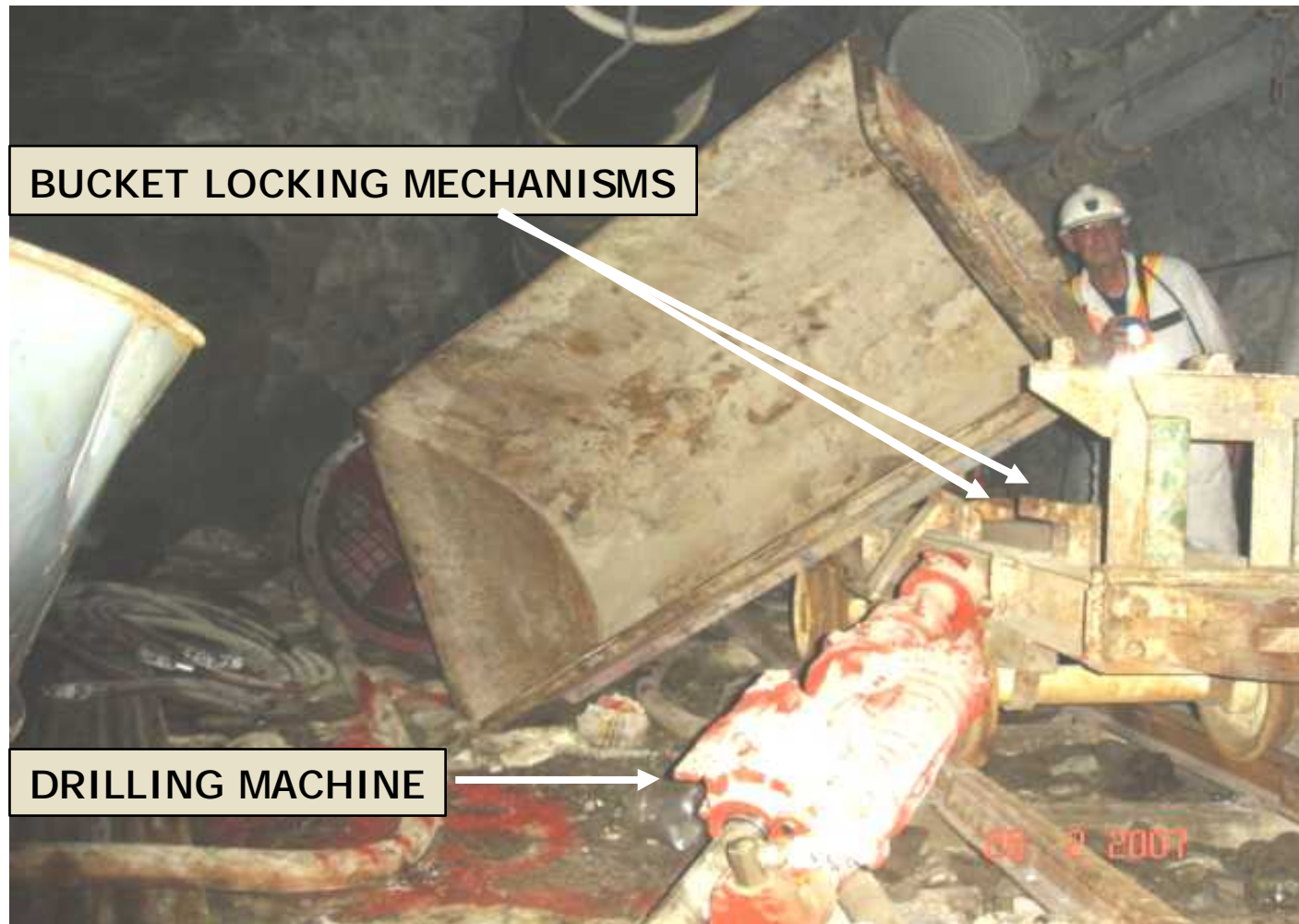
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What caused the Contractor team to act in the way they did?  
What influenced their behavior?

Common practice for Contractors to make use of tippers for transport of equipment as correct and quantity of material cars are not always made available to them  
(Cars not “fit for purpose”)

At risk conditions forced unsafe behavior by Contractor to off-load equipment.

## No. 3 SHAFT FATAL ACCIDENT SCENE

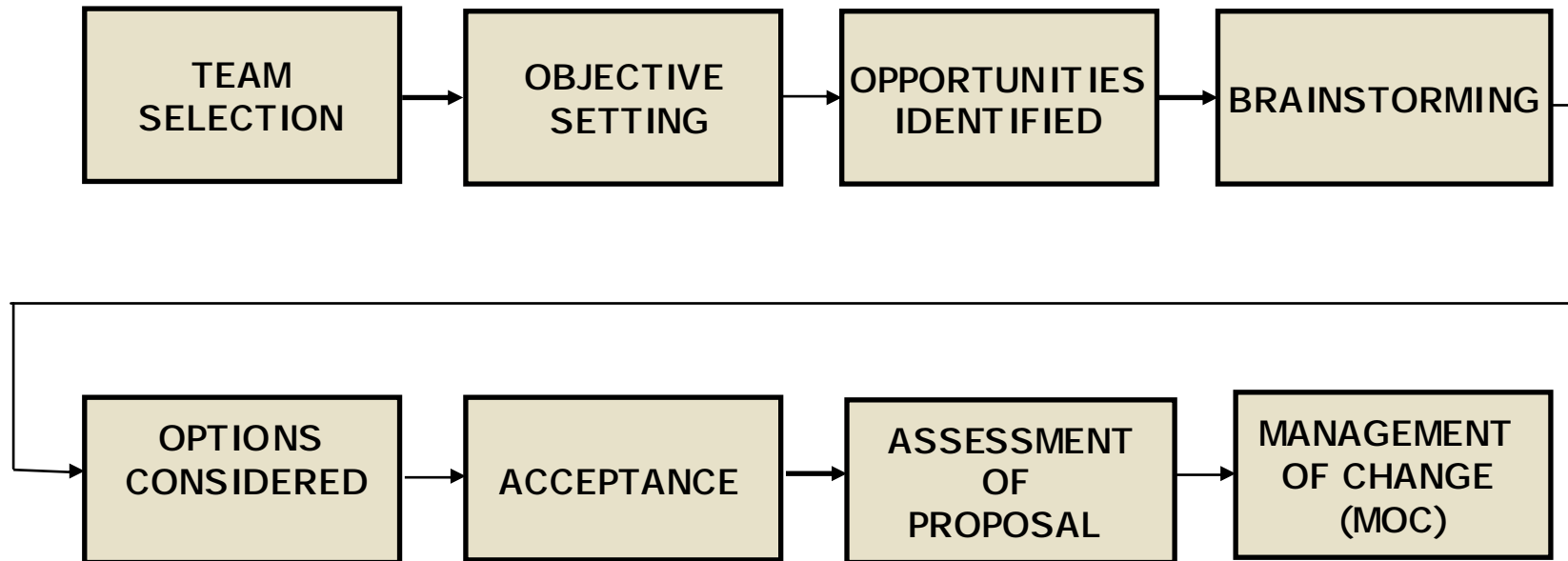


# KLOOF 7 SHAFT TEAM DECIDED TO TAKE A CLOSER LOOK AT THE CURRENT DESIGN

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# SIMPLIFIED PROCESS FOLLOWED FOR THE DESIGN REVIEW





## CURRENT DESIGN AND CONSTRUCTION

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### Flaws and opportunities for improvement

- Current design unstable as the center of gravity is displaced away from centerline of chassis allowing the bucket to topple over.
- No means provided to contain the bucket whilst being tipped.
- Mismatched buckets are common as they are not fixed to the chassis.
- No “positive locking” device in place. (Although, the existing dual gravity activated locking mechanism works well, it could be released accidentally by accumulation of rocks or material next to the tracks)
- Unguarded nip points between bucket trunions and chassis

## POSITIVE LOCKING DEVICE – OPTION 1

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# POSITIVE LOCKING DEVICE AND RETAINER BRACKET – OPTION 2



# PROPOSAL ACCEPTED

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## ASSESSMENT OF PROPOSAL

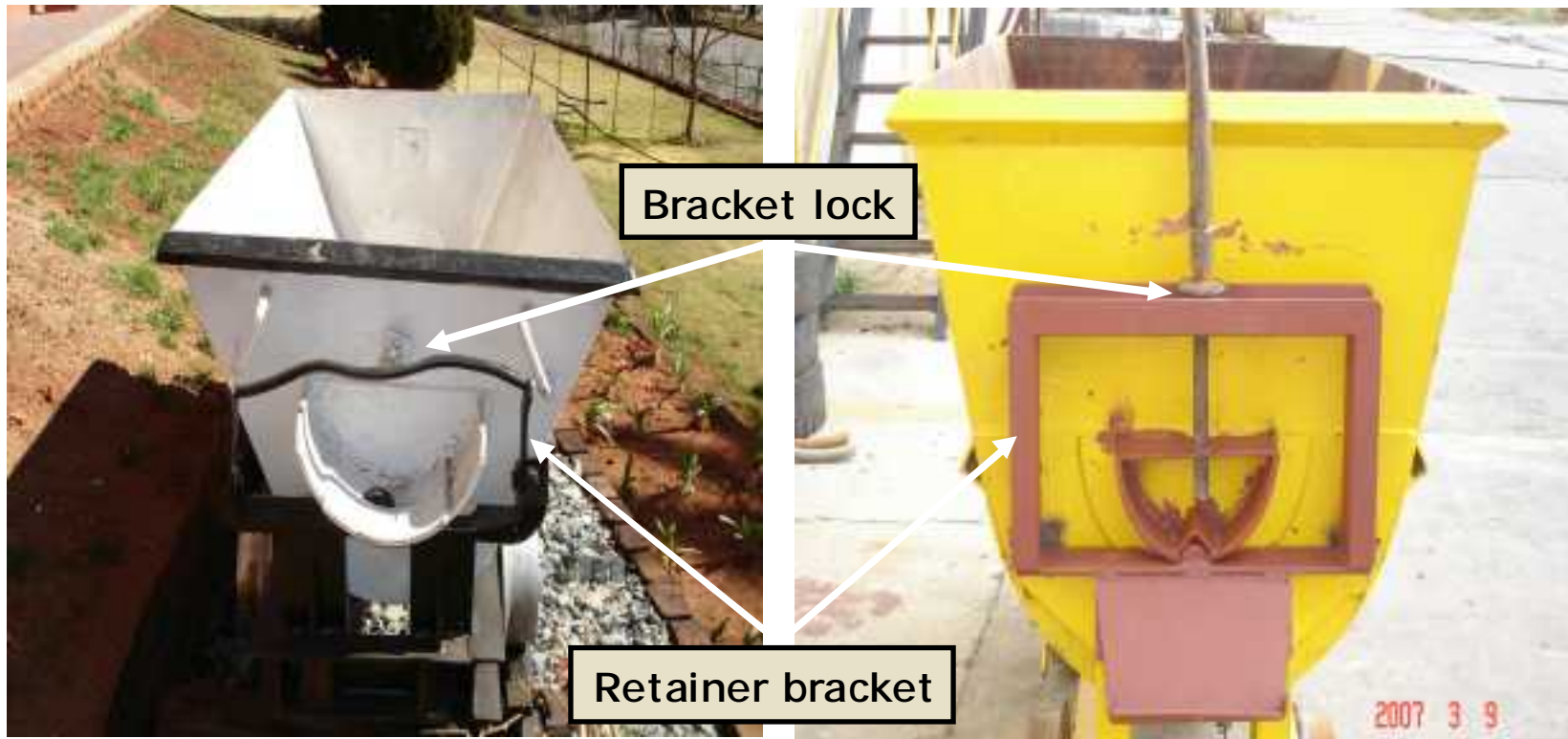
### Flaws and opportunities for improvement

- Current design unstable as the center of gravity is displaced away from centerline of chassis allowing the bucket to topple over.  
**(Retainer bracket)**
- No means provided to contain the bucket whilst being tipped.  
**(Retainer bracket)**
- Mismatched buckets are common as they are not fixed to the chassis.  
**(Retainer bracket)**
- No “positive locking” device in place. (Although, the existing dual gravity activated locking mechanism works well, it could be released accidentally by accumulation of rocks or materials next to the tracks)  
**(Shackle pin locking)**
- Unguarded nip points between bucket trunions and chassis  
**(Expanded metal guarding)**



## DID WE RE-INVENT THE WHEEL ?

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## TIPPER IN OPERATION

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# TIPPED POSITION COMPARISON



Modified tipper



Original tipper

## CONCLUSION

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### Advantages

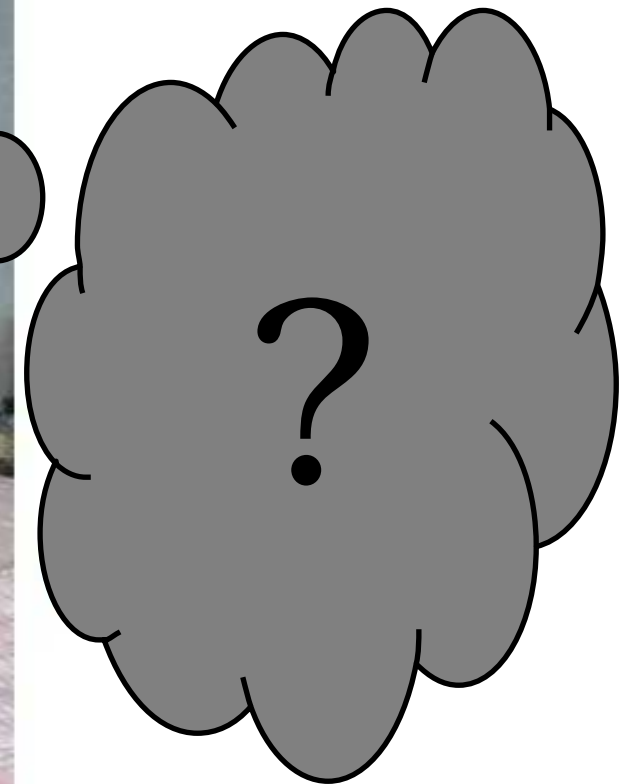
- “Positive” locking facility on bucket utilising standard coupling pin.
- Bucket cannot topple over and dislodge from chassis
- Center of gravity in the tipped position is more in line with centerline of chassis
- Improved discharge of load (away from tracks)
- Should the side tipper fall over, the bucket will not dislodge from the chassis.
- Bucket should remain in tipped position after tipping
- Mismatched buckets/chassis will not occur as car remains as a unit.
- Guarding of nip points achieved
- Modification costs are low as readily available material is used.
- Modifications can be done on-site

## CONCLUSION

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### Disadvantages

- In the event of a build-up of old hardened material in the bottom of the bucket, may act as a counter weight making it difficult to remain in the tipped position.
- Discharge angle slightly flatter. (Although no difficulty in clearing load)



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