Vehicle And Technology Evaluations

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Current Issues

- **Wheel Security**
- Vehicle Stability
- Car Transporter Safety
- Coupling and Uncoupling
- Tail Lifts
- **Maintenance & Inspection Issues**
- **Tipper Vehicle Stability**
- Health & Safety
- Driver Training
- Fuel Economy
- Emissions
- Licensing

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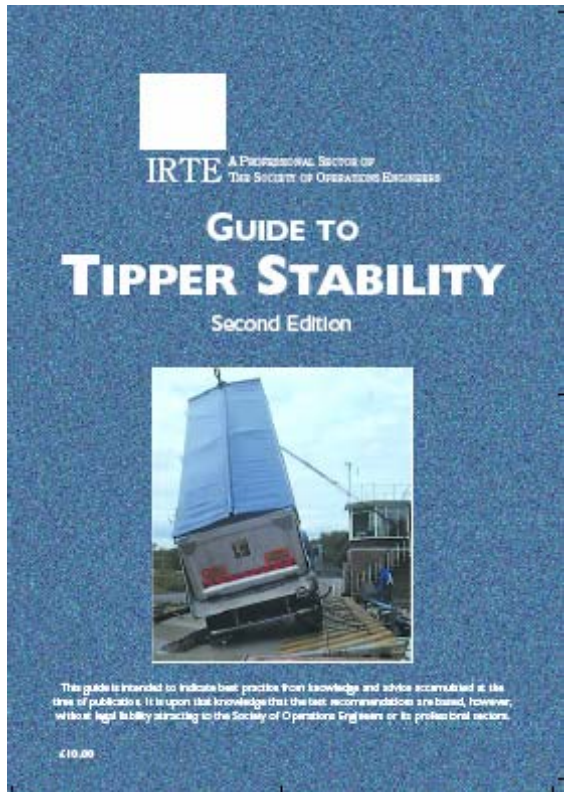
A Guide to Tipper Stability



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Tippers Overturning

- Incidents of tippers overturning are of considerable concern to the road transport industry
- Vehicles falling over sideways when discharging a load
- No British or European recognised design standard

The IRTE Guide

- First published in 1992
- Outlines minimum stability standard
- Relates to vehicles tipping on unmade or uneven ground
- Since the introduction of the guide there have been significant changes to the design, tyres, operating weights, etc.

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Revised Edition

- **Category B**
  - minimum stability standard when tipping on hard level surfaces
- **Category A**
  - standard intended to cope when vehicles are tipping on unmade or unlevel ground

Confirmation of Fitness

- **Category B**
  - tipper capable of staying stable when fully loaded with the body fully raised on a 5° side slope
- **Category A**
  - tipper capable of staying stable when fully loaded on a side slope angle of at least 7°

The Tilt Test

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Safely Secured

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Possible Considerations

- Tyre deformation
- Twisting of chassis rails & front hydraulic cylinder
- Trailer rear body twist
- 5th wheel coupling separation & loosening
- Slipping of retaining bolts

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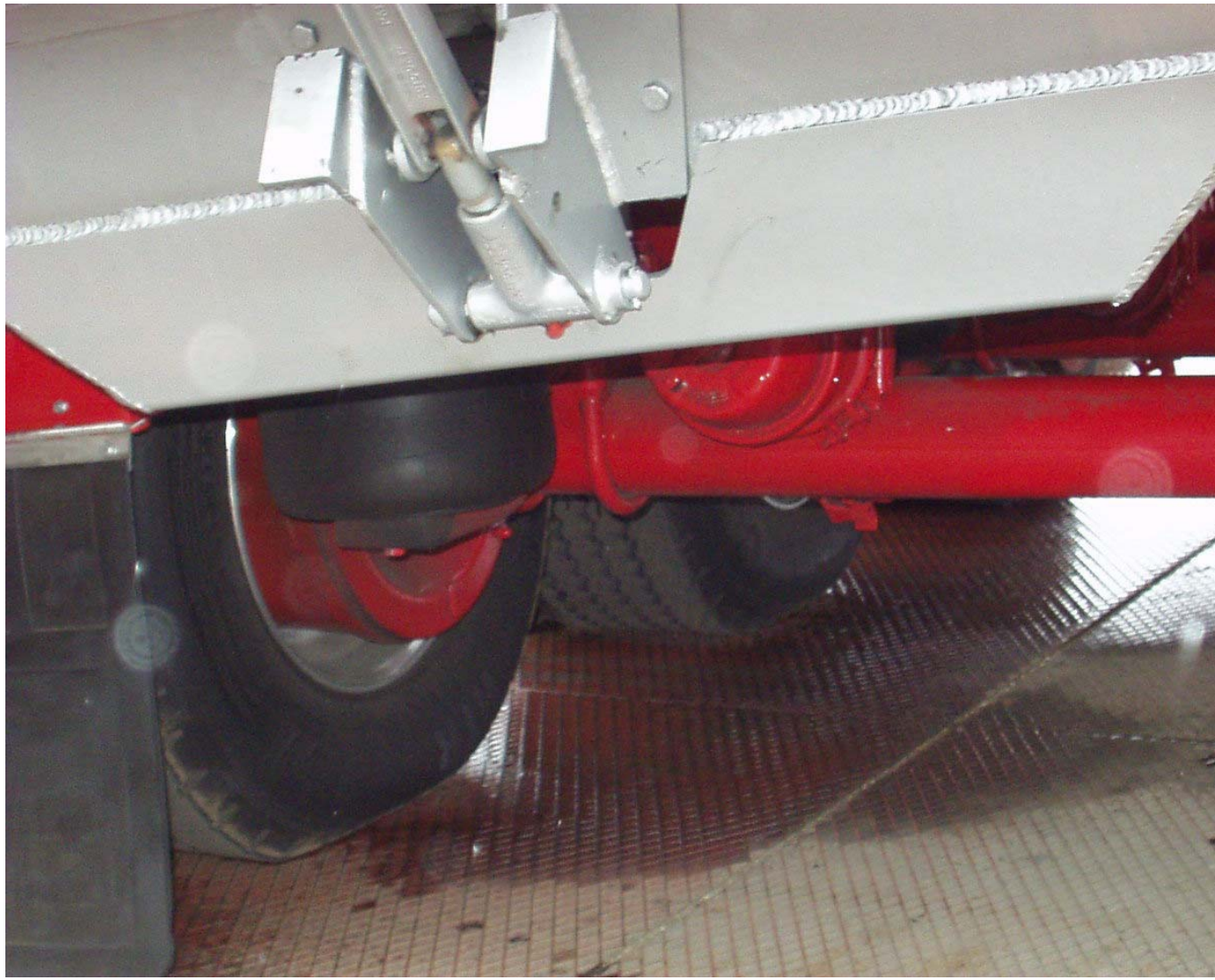
Tyre Deformation



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Twisting of Hydraulic Cylinder

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Body Twist

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The IRTE Guide to Tipper Stability

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Safety Concerns

- Vehicles capable of obtaining necessary angle of tilt when new
- Used vehicles profoundly under perform
- Construction companies banning the use of tippers on their sites
- Suggestion the EU may introduce a total ban on tippers within 10-15 years

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Wheel Security

The Problem

Loose road wheels do not **just** gently fall off a moving vehicle

Unofficial Statistics

It is estimated that 3,000 incidents occur & an average of 10 people die each year in the UK from wheels that detach themselves from commercial vehicles

The Investigation

- IRTE first began its investigations in the 1980's
- Fundamental safety issue
- Emotionally charged judgements
- The cry of 'bad maintenance'
- Defective design or material specification
- Quality control

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Areas of Research

- Design defects
- Yield characteristics
- Torque settings
- Nut slackening
- Painted wheels
- Differential expansion
- Nut alignment
- Tightening to strain
- Stud failure
- Lubrication

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It is not a mystery

- In the past the problem of wheel loss has been considered a mystery
- A considerable amount of research has been undertaken
- There are established scientific reasons for wheel loss
- It is certainly not a mystery

Fundamental design problem

- Wrong engineering approach
- No one expects to keep checking wheel nuts on a car
- Good maintenance policy reduces the risk of wheel loss

Clamping Force

- Primary function of wheel fixing - clamp wheel to hub
- Clamping force must be sufficient to maintain enough friction between mating surfaces

Lubrication

- Lack of initial clamping force due to high friction can be resolved with appropriate lubricant
- Both stud and nut threads should be lubricated

The Phenomenon of Settlement

- Early relaxation of tension in the wheel fixing after initial tightening
- May occur even when vehicle is stationary
- Can be corrected by retightening after 30 minutes if vehicle is stationary or within 40-80 km if vehicle is used

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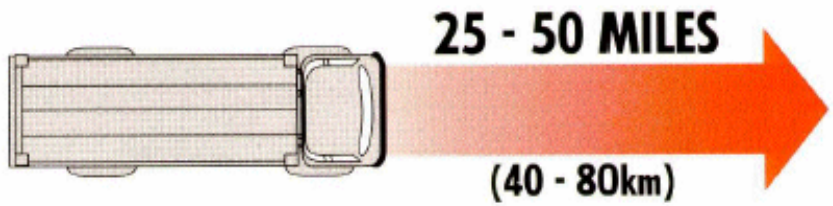
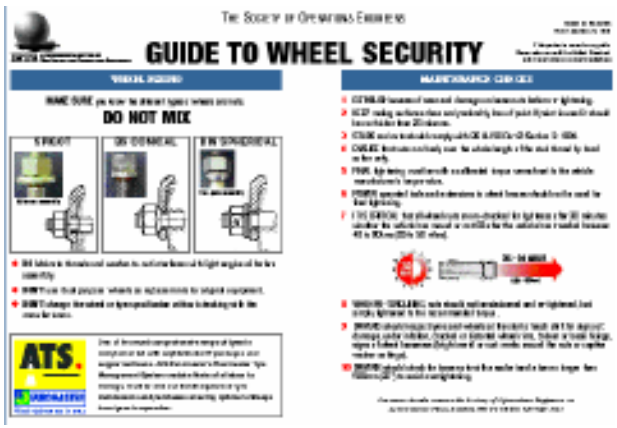
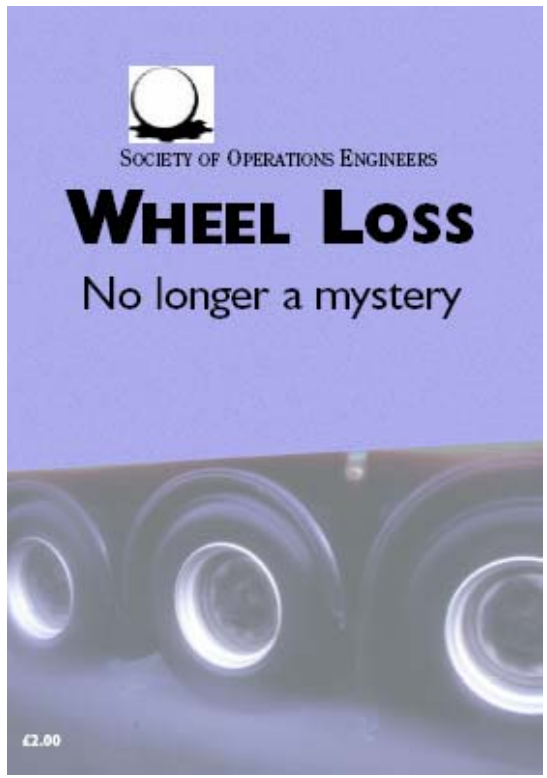


SOE/IRTE Position

Current policy is to support recommendations of BS AU50 Part 2 Section 7a 1995





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The Recommendations - part 1

- Identify the type of wheels and nuts used
- Do not mix wheels & nuts
- Establish causes of wear & damage
- Studs & nuts should comply with BS AU 50 Part 2: section 3: 1994
- Keep mating surfaces clean & preferably free of paint
- Provide appropriate lubrication to threads & interfaces

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The Recommendations - part 2

- Final tightening must be with a calibrated torque wrench
- Wheel nuts are re-checked for tightness after 30 minutes or after the vehicle has travelled between 40 - 80 kms
- When re-torquing nuts should be tightened to the recommended torque
- Drivers should inspect tyres & wheels at the start of each shift

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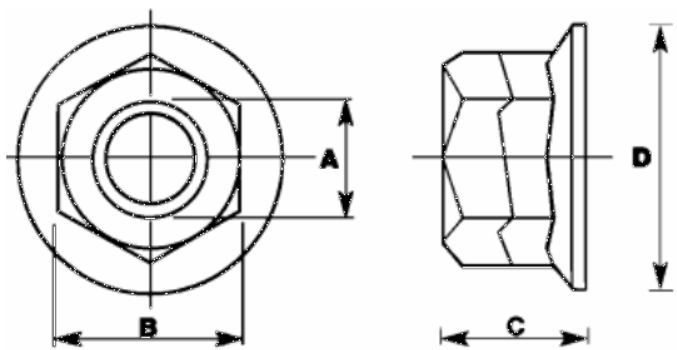
Devices for Preventing Wheel Loss

- Devices which maintain the initial clamping force
- Devices which indicate whether the wheel nut has moved

Wheel Loss Devices



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Conclusions

- Problems occur after wheels have been removed or fastenings have been disturbed
- Greatest effort should be concentrated here

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Maintenance & Inspection Issues

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The Vehicle & Operators Services Agency (VOSA)

- Formed on 1 April 2003
- Committed to customer service improvements
- Merger of Vehicle Inspectorate (VI) & Traffic Area Network (TAN)

Aim of the Agency

Contribute to the improvement of road safety and environmental standards, and to the reduction of vehicle crime

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VOSA Customers

- The Road Haulage & Public Service Vehicle Industries
- Trade associations
- Vehicle manufacturers
- MOT garages
- The public

VOSA Services

- MOT
- Licensing
- Testing & inspections
- Bus registration
- Enforcement & compliance
- Accident investigation & technical research
- Education & training

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VOSA Standards of Service

- Delivering good quality
- Convenient & responsive
- Employ new technology
- Customer focused
- Fair & effective

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The Relationship

IRTE feels it would be mutually beneficial to form an open technical forum with VOSA

The Main Issues

- Inspection decisions
- Compliance issues
- Inconsistency in procedures & interpretation
- Test failure rates
- Re-test failure rates
- Achievement of standards
- League tables
- Use of statistics

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The Questions

- Why > 20% of 1year old trucks fail test?
- Why when trailers are better engineered test pass rate declines?
- Why dealer maintenance contracts have not improved test performance?
- Why inconsistency in test decisions?
- Why has the collection of statistics not resulted in actions?
- What are the root causes?

The Way Forward

- Familiar questions
- Basis of considerable debate & discussion
- High standard of testing & inspection
- Majority of vehicles well serviced & maintained
- Problem of interpretation & consistency
- Frank dialogue with inspecting authority

The End

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