HEAVY VEHICLE DRIVER FATIGUE
TWO-UP DRIVING POLICY
PROPOSAL

March 2006

Prepared by
National Transport Commission
## REPORT OUTLINE

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| Objectives:      | The Heavy Vehicle Driver Fatigue (HVDF) review is a key component of the third heavy vehicle reform package. The aim of this review is to improve road safety through the implementation of policies and practices addressing the management of fatigue in the road transport supply chain |
| NTC Programs:    | Fitness for Duty, Heavy Vehicle Driver Fatigue |
| Key Milestones:  | This policy document is being released at this date for public information only. Public consultation on both draft legislation and revised policies developed for the Heavy Vehicle Driver Fatigue reform will take place later in 2006 upon receipt of the draft legislation. |
| Abstract:        | The practice of two-up driving is used to cover ultra long distances within Australia. Under current road transport regulations two-up drivers operate under Standard Hours. This means a vehicle can be operated continuously by a two-up team for 6 x 24 hour periods before an extended rest break. This is considered to be excessive by some fatigue experts. Since not enough is known about the practice, the NTC undertook to examine the issues surrounding the practice of two-up in order to develop clearly defined parameters for its use. The agreed parameters will be incorporated into the final Heavy Vehicle Driver Fatigue regulations. |
| Purpose:         | Proposed policy for information purposes only. |
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| Comments by:     | Not applicable |
FOREWORD

The National Transport Commission (NTC) is a body established under an inter-governmental agreement with a charter to develop, monitor, and maintain uniform or nationally consistent regulatory and operational reforms relating to road transport, rail transport, and inter-modal transport. The NTC is funded jointly by the Australian Government, States and Territories.

Fatigue is one of the main causes of crashes involving heavy vehicle drivers. The Heavy Vehicle Driver Fatigue (HVDF) Review is a key component of the Third Heavy Vehicle Reform Package. The aim of this review is to improve road safety through the implementation of policies and practices addressing the management of fatigue in the road transport supply chain.

This policy paper articulates the NTC’s view on two-up driving issues which were unresolved at the time of the ATC endorsement of the HVDF policy proposal in 2004. Presenting the issues and stating the NTC position on two-up is intended to assist stakeholders in understanding the rational behind this policy proposal and the options which were taken into consideration in reaching this proposal. Stakeholders should note that the views expressed are those of the NTC which have been informed by discussions with industry, regulators and relevant experts. These views have not been endorsed by any other organisations including the Transport Agencies Chief Executives or by industry peak bodies.

The policy position put forward in this paper is subject to change. The NTC will be undertaking further consideration of these issues over the coming months and will advance a final draft Heavy Vehicle Driver Fatigue two-up policy proposal in mid 2006, after consultation with transport agencies and industry.

Final Heavy Vehicle Driver Fatigue draft policy proposals will be made available through the NTC website along with the draft legislation and a regulatory impact statement.

While NTC is not formally seeking comment on this paper, the project manager is happy to consider any written or verbal responses and may be able to attend meetings or seminars to discuss the policy issues. Contact details are below. The NTC plans to release the package of revised policy papers, Regulatory Impact Statement and draft legislation in August 2006 for a 6 week period. Formal comment will be sought at that stage. Comments will then be analysed and a final package will be sent to the Australian Transport Council for endorsement in December 2006.

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Michael Deegan
Acting Chairman
SUMMARY

Two-up driving is used to cover ultra long distance trips, to address demands with particular types of freight, for training purposes, and to accommodate tight schedules.

Under the current road transport regulations two-up teams are covered by the same requirements that apply to solo drivers operating under Standard Hours. This means that a heavy vehicle can be operated continuously by a two-up team for 6 x 24 hour periods before an extended rest break of 24 hours is required. This is considered to be excessive by fatigue experts.

The proposed policy will provide a three tiered scheme for two-up operations with additional flexibility for hours of operation being provided to those transporters who can demonstrate that they are managing this type of operation well. Accreditation under the revised National Heavy Vehicle Accreditation Scheme (NHVAS) will be required to obtain this greater flexibility. Additional stationary night rest breaks for two-up teams will be a requirement under all three tiers.

From a safety point of view, two-up driving has some distinct advantages over the single driver operation such as:

- the presence of another driver in the vehicle which is an instant and very effective countermeasure to extreme sleepiness allowing a tired driver to hand over the wheel when fatigued;
- reduced driving time and generally shorter continuous driving shifts for each driver;
- an increased ability to adopt more regular sleep schedules on long trips;
- a reduction in the average driving time-on-task;
- more frequent rest opportunities and the ability to nap when required;
- the lack of distractions and competing activities;
- the use of a familiar environment;
- less security concerns for drivers;
- the vehicle can be kept on the road for the full 24 hours, and
- freight can be delivered to regional areas quicker than if managed by a solo driver.

Balanced against these advantages are the issues of:

- poorer quality sleep in a moving vehicle;
- possible greater fatigue at the beginning of a trip if pre-trip preparation is poor;
- one driver is likely to be driving during circadian low points; and
- shorter principal rest periods and rest stops.

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1 Knipling, R (2006)
Since not enough is known about the practice, the NTC undertook to examine the issues surrounding two-up in order to develop clearly defined parameters for its use. An on road study, which monitored the performance of two-up teams travelling across the continent, was conducted. However, this study was inconclusive. Following subsequent consultation with a number of two-up operators, with fatigue experts, and with transport agencies, the NTC is proposing the following parameters for two-up operations.

Measures to manage the fatigue risk in two-up operations comprise both regulatory and non-regulatory.

The NTC is proposing a three tier system for two-up operations similar to that put forward for solo drivers.

Parameters proposed for the default **Standard Hours** for two-up driving are as follows:

- maximum 12 hours work by any one driver in 24 hours;
- minimum continuous rest break of 5 hours in 24 hours for each driver in a two-up team which can be taken in a moving vehicle; (set in regulations)
- maximum 42 hours in *a moving vehicle* for **both drivers** before a stationary rest break of at least 10 hours; and
- in any 7 day period, a minimum 48 hours stationary rest for each driver with a minimum 24 hour rest break, and the remainder to be taken in minimum blocks of 7 hours rest (see section 3.5.4).

  This stationary rest requirement to include at least four nights\(^2\) rest in 14 days (two of which must be consecutive).

This would provide a maximum of 60 hours work and would ensure at least 108 hours rest for both drivers in 7 days.

Parameters proposed for the second tier **Basic Fatigue Management (BFM)** option are as follows:

- maximum 14 hours work by any one driver in 24 hours;
- minimum continuous rest break of 5 hours in 24 hours for each driver in a two-up team which can be taken in a moving vehicle; (recommended not set in regulations);
- maximum 72 hours in *a moving vehicle* for **both drivers** before a stationary rest break of at least 10 hours; and
- in any 7 day period, a minimum 48 hours stationary rest for each driver with a minimum 24 hour rest break, and the remainder to be taken in minimum blocks of 7 hours rest (see section 3.5.4).

  This stationary rest requirement to include at least four nights rest in 14 days (two of which must be consecutive).

This would provide a maximum of 140 hours work and would ensure at least 196 hours rest for both drivers in 14 days.

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\(^2\) Night rest to be taken between 22.00 – 08.00 hours
Tier three, the **Advanced Fatigue Management (AFM)** option for two-up driving will accommodate the anticipated small number of two-up operations which fall outside the BFM limits. Under AFM, proposals will be prepared by operators and assessed by regulators on a case by case basis. The AFM parameters will be specified either in the legislation or in National Heavy Vehicle Accreditation Scheme fatigue module.

Finally, two-up operators operating under the BFM and AFM options will be required to incorporate additional measures to manage the human factors associated with this type of operation. These measures will be addressed through non-regulatory channels such as the incorporation of recommendations into the Guidelines for Managing Heavy Vehicle Driver Fatigue, regular bulletins addressing fatigue management, driver health and medical issues; and the incorporation of requirements into NHVAS accreditation standards, operator awareness raising, driver education and training materials.

After further consultation with industry and government, the final agreed parameters for two-up driving will be incorporated into the final Heavy Vehicle Driver Fatigue regulations.
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1. INTRODUCTION

The Heavy Vehicle Driver Fatigue (HVDF) proposal given in-principle approval by the Australian Transport Council in 2004 outlined a range of measures to improve the safety performance of heavy vehicle drivers by improving the management of fatigue. Although two-up driving requirements were mentioned in this proposal no separate parameters for the use of two-up were put forward.

Under the current regulatory regime two-up drivers operate under the Standard Hours requirements as applied to solo drivers. Currently two-up teams can travel continuously for up to 144 hours in 7 days (6 days x 24 hours) before a requirement to have a stationary rest break of 24 hours. This is considered to be excessive by fatigue experts. In the United States and Canada, where two-up or team driving is also used, regulations do not require team drivers to obtain stationary rest during the course of their trips.

Two-up operations are high productivity operations managing the road freight task over ultra long distances. The availability of a relief driver provides a very effective fatigue countermeasure although by their nature these operations carry a greater risk of fatigue. To date, two-up driving in Australia appears to have a good safety record, though accident statistics often don’t report whether an accident involved a two-up operation. In future, two-up driving may become of increasing importance to the road transport industry with the increasing cost of capital equipment, the increasing sophistication of the logistics chain and the advent of new driving hours legislation. However, the take up rate of two-up may be constrained by the current driver shortage in the industry.

To this end, the NTC has developed this proposal based on advice from fatigue experts, from experienced two-up operators, transport agencies and from available research. Although there are no statistics available on two-up, anecdotal evidence points to a relatively safe practice, if undertaken with commitment. Current research has been unable to provide evidence that there are any major safety issues with two-up operations and comparison of both two-up and solo operations have found that two-up for longer trips is a safer practice. The key issue for current policy development is to allow a choice of two-up driving in appropriate applications whilst achieving acceptable safety outcomes.

In 2001, the Fatigue Expert Group recommended:

(a) limiting the period for which continuous two-up driving is permitted, before both drivers are required to take a long stationary sleep break (preferably overnight);

(b) ensuring that both night sleep opportunities and night work are shared roughly equally between the two drivers;

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4 Dingus, TA et al (2001) found that for long trips of extended driving, the team driving system likely reduces the impact that fatigue has on a driver’s performance and two-up drivers also ‘maintain a relatively constant level of alertness throughout the 24-hour clock’

5 FMCSA (2000) This study found that there were significant differences between the stress and fatigue effects of operating single vehicle and multi-combination vehicles such as road trains. Triple road train (A-dolly) configurations resulted in the highest level of workload and fatigue amongst drivers studied.

6 One east coast operator mentioned only 2 incidents in 30 million kms.

providing adequate opportunities for full recuperation: at least two consecutive stationary night sleep opportunities per week.

Providing these basics are addressed, prescription of minimum continuous break periods (or maximum continuous driving shifts) during the on-road part of a two-up operation is probably undesirable: limiting flexibility in this area could produce the undesirable result of forcing the less-fatigued driver to rest, while the more-fatigued driver takes the wheel.’

2. STEPS TAKEN TO REACH PROPOSED POLICY

2.1 NTC Two-up Study 2004/5

Since not enough was known about two-up driving, the NTC undertook to investigate the practice. An on-road study was conducted to monitor the performance of two-up teams travelling across the continent and within the larger States. The general conclusion from the study was that the level of fatigue risk in the two-up heavy vehicle industry is quite low, with a relatively high and consistent level of driver performance. However, to ensure the data were valid, participants were tested for stimulant use and the findings, while inconclusive suggested some possibility of stimulant use. The inter-jurisdictional committee overseeing the study considered that as a precaution, the study should be deemed unreliable for determining policy for two-up driving. The final report from the study is being released along with this policy paper for information.

The NTC and the Transport Agency Fatigue Committee (TAFC) proceeded with discussions on parameters for two-up based on a discussion paper outlining existing relevant research (see references), and proposals received from the Australian Trucking Association (ATA) and the Australian Road Train Association (ARTA) in 2004. Two-up operators, fatigue experts, and transport agencies were extensively consulted in the course of developing these parameters.

2.2 Research Findings on Two-up Issues

Research indicates that few comparisons have been made between single and two-up operations and heavy vehicle crash statistics do not substantiate any claim that two-up operations are more risky than single operations. However, the combination of long driving times and multiple day trips involved in two-up with a corresponding high risk of cumulative fatigue is of concern.

Current research both overseas and in Australia is inconclusive on whether the quality of sleep in a moving vehicle presents a safety risk for two-up operations. Studies have found that two-up drivers get more sleep than solo drivers, but one major on-road study in the United States (US) found that the quality of sleep in a moving vehicle was an issue for many two-up drivers. The study also found that one factor which could have a major influence on a driver’s ability to sleep in a moving vehicle is the driver’s confidence in the partner’s driving ability and their ability to sleep in a moving vehicle. Another finding

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8 Henderson (1990) found that ‘the few studies that allow direct comparison of crash-rates between single and two-up drivers have shown little significant difference between the two operations’.

9 Dingus, TA et al (2001). There were a number of findings as part of this study that indicated that the quality and depth of sleep was worse on the road, particularly for team drivers.

10 Dingus, TA et al (2001). If teaming, drivers should be allowed a voice in selecting their driving partner so that drivers are teaming with someone they trust.
was that two-up drivers were better able to manage their fatigue than single drivers and better able to avoid high crash risk situations due to the presence of a second driver\textsuperscript{12}.

This issue of \textit{quality of sleep in a moving vehicle} is unique to two-up operations. In the US and Canada, where two-up or team driving is also used, the issue of sleep quality in a moving versus a stationary vehicle has not been examined in depth nor has the option of requiring two-up or team drivers to stop at some point in their work cycle to compensate. Instead policymakers in these countries have been primarily concerned with the issue of split rest\textsuperscript{13}.

Canadian policymakers are currently proposing a maximum 14 hours work and 10 hours off-duty in 24. Two-up drivers will be required to take a minimum 8 hours continuous rest period in a sleeper berth which can be split 4 hours + 4 hours.

The recently revised US hours of service (HOS) regulations require a minimum 8 hours continuous rest period in a sleeper berth with an additional 2 hours minimum rest period. This regulation applies to both solo and team operations. The resting team driver must remain in the sleeper berth for a full 8 hours. This requirement limits the flexibility which two-up or team drivers would normally have—to take a break when they feel tired—and extends each driver’s time on task. This requirement has been rejected by the Owner-Operator Independent Drivers Association and the California Trucking Association in the US who are currently seeking to have this requirement rescinded.

2.3 Discussions with Two-up Operators

Following discussions with transport agencies, the NTC fully briefed the participating two-up operators on the findings from the 2004/5 on-road study, and took the opportunity to elicit discussion and comment from these operators on the following preliminary proposed parameters for two-up.

\textbf{Standard Hours Option}

- Maximum 12 hours continuous work per driver in 24
- Minimum 7 hours continuous rest in 24
- Maximum 42 hours in vehicle before a rest break of 12 hours away from the vehicle
- Mandatory 48 hours off in every 7 days.

\textsuperscript{11} Dingus, TA et al (2001). Many drivers can only receive quality sleep in a stationary truck, therefore team drivers should be selected based on their ability to sleep in a moving truck.

\textsuperscript{12} Dingus, TA et al (2001). From the data collected in this study, it was apparent that the team driving operation translates into fewer bouts of drowsiness, fewer critical incidents, and in general, safer trucking operations.

\textsuperscript{13} ‘Split rest’ refers to the sleep-wake cycle. Experts generally consider that there is a minimum continuous period for restorative sleep (around 6 hours), and that ideally, this period should not be ‘split’ to change drivers.
Basic Fatigue Management Option
Maximum 14 hours continuous work per driver in 24
Minimum 7 hours continuous rest in 24
Maximum 72 hours in vehicle before a rest break away from the vehicle
Mandatory 48 hours off every 7 days.

Advanced Fatigue Management Option
Application for accreditation will be assessed on a case by case basis especially where duties other than driving are involved. Comprehensive individual fatigue risk management plans will be required from each transport operator.

Following these discussions, some further work has been done to more fully describe the parameters needed, to reconsider the emerging and existing research, and the advice of fatigue experts on the proposed parameters. Having regard to this work, NTC’s proposal is outlined in section 3.

3. NTC’S PROPOSED PARAMETERS FOR TWO-UP DRIVING

3.1 Overview of Proposed Parameters for Two-up
While the Standard Hours parameters are more restrictive, parameters under BFM and AFM will allow two-up operators more flexibility in designing schedules. This will provide a balance between work and rest for two-up drivers addressing the fatigue management risk in these ultra long distance operations.

It is important when considering the parameters put forward, that the proposed legislation will include some definitions that may differ from the current regime. For example:

- **Work** now includes **both driving and non-driving activities**.
- **Night work** refers to work undertaken between the hours of midnight and 6.00a.m.
- **Night rest** refers to rest taken between the hours of 10.00p.m. to 8.00a.m.

Important factors to consider when assessing the proposed parameters include:

- Parameters are based on the inherent safety feature that is unique to two-up operations - the presence of a second driver.
- The parameters proposed here are MAXIMUM limits for work and MINIMUM requirements for rest breaks, both short and continuous.
- It is the combination of the parameters that ensure adequate rest – no one parameter should be considered independent of the others.
- A two-up operation is a specialist operation. Success will greatly depend on careful management of the social and human factors in this type of operation. (See Section 2.12).
- Given the specialist nature of two-up operations, it is highly desirable that two-up operators take-up the BFM or AFM options. The parameters proposed for the
Standard Hours option are therefore very conservative and are based on the assumption that the social and human factors are likely to be poorly managed.

- The importance of incorporating a reasonable amount of flexibility in return for better accountability, so that industry can move to manage fatigue in ways that suit its operations rather than trying to match industry’s work demands to prescriptive more inflexible working hours regulations.

3.2 Standard Hours Option

A Standard Hours regime for two-up operations similar to that for solo drivers could arguably provide an entry level point for road freight transport operators considering two-up. It could also be used by those operators who make use of two-up on an infrequent, ad-hoc basis. Parameters are conservative based on fatigue expert advice and recognising that critical factors such as driver selection and training, comfort, sleeper berth design, and pre-trip preparation, may not be adequately addressed.

3.3 Basic Fatigue Management Option

Existing research indicates that two-up, if managed properly, is a safe practice for long distance freight transport.14

The proposed parameters for two-up under BFM are based on the assumption that two-up operators in this category are experienced and proactive in their approach to safety with good fatigue countermeasures already in place such as those mentioned above. Under this option, fatigue countermeasures, set by strict NHVAS accreditation requirements, will be incorporated into a two-up operators day-to-day business practices and monitored through regular audits. As a result two-up operators will be provided with additional flexibility in operational parameters.

3.4 Advanced Fatigue Management Option

NTC does not consider it necessary to set parameters for the AFM option. As described above, the parameters work in combination to achieve safe outcomes. Under AFM, operators may wish to vary one parameter to meet their needs. To ensure a safe operation, it may be necessary to alter other parameters to compensate. As a result, setting prescriptive requirements under AFM can only limit potential applications, consequently only the minimum regulatory requirements are mentioned in this paper.

3.5 Explanation of Proposed Parameters

3.5.1 Short Rest Breaks

The purpose of setting this parameter is to ensure drivers have regular breaks interposed between driving periods to prevent cumulative fatigue and to break the monotony of the task. NTC proposes that:

1. For two-up teams working under the Standard Hours option:

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14 Dingus et al (2001). Two-up drivers were generally ‘very successful at avoiding circumstances of extreme drowsiness’ and team driving operation involved ‘fewer bouts of drowsiness, fewer critical incidents and in general, safer trucking operations’.
short rest breaks be mandated to correspond with those proposed for solo drivers (refer Table 1 below). The required short rest breaks will be incorporated into the HVDF regulations based on the assumption that those teams operating under Standard Hours have fewer fatigue countermeasures in place.

2. For two-up teams working under the BFM option:

short rest breaks will be recommended in the Guidelines for Managing Heavy Vehicle Driver Fatigue and in the NHVAS accreditation standards. They will not be mandated in the regulations. Careful screening of two-up drivers and matching of teams required in the BFM and AFM options should go some way towards ensuring the driving task, in this case, is shared equally between both experienced drivers including married teams.

Table 1. Proposed Short Rest Breaks under Standard Hours

<table>
<thead>
<tr>
<th>Time</th>
<th>Work</th>
<th>Rest</th>
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</thead>
<tbody>
<tr>
<td>In any period of…</td>
<td>A driver must not work for more than a MAXIMUM OF …</td>
<td>With the balance of hours taken as off duty with the MINIMUM following rest breaks</td>
</tr>
<tr>
<td>5 hours 30 minutes</td>
<td>5 hours 15 minutes</td>
<td>15 minutes</td>
</tr>
<tr>
<td>8 hours</td>
<td>7 hours 30 minutes</td>
<td>30 minutes (For example 2 x 15 minutes)</td>
</tr>
<tr>
<td>11 hours</td>
<td>10 hours</td>
<td>60 minutes For example 2 x 30 minutes or 4 x 15 minutes or 2 x 15 minutes + 1 x 30 minutes</td>
</tr>
</tbody>
</table>

3.5.2 Minimum Continuous Rest Break in 24 Hours

The purpose of setting this parameter is to ensure both drivers get adequate restorative rest over a 24 hour cycle. NTC proposes that:

1. For two-up teams working under the Standard Hours option:
   - a minimum continuous rest break of 5 hours in 24 hours be mandated for each two-up driver.

2. For two-up teams working under the BFM option:
   - a minimum continuous rest period of 5 hours will be recommended for two-up operations under BFM and AFM in the Guidelines for Managing Heavy Vehicle Driver Fatigue and in the business rules under the proposed NHVAS accreditation scheme.

Expert advice is that it becomes more difficult to secure adequate restorative rest if the opportunity for sleep is split into short periods. A period of 7 hours continuous rest was
initially proposed for two-up drivers based on the parameters for solo driving, however, feedback indicated that two-up drivers prefer a shorter change over cycle e.g. every 4-5 hours\(^{15}\) at night and every 5-6 hours or so in daytime (most likely influenced to some extent by the current regulations). The nature of the two-up operation is that drivers change over *when they feel tired* with sleep requirements varying from individual to individual\(^{16}\). Extending this parameter from 5 to 6 or even to 7 hours continuous removes the inherent flexibility in the two-up arrangement, where drivers select the change over sequence themselves which they find most beneficial.

Night driving especially between the hours of midnight to 6.00 am carries a higher fatigue risk than daytime driving. The Fatigue Expert Group (FEG) recommended that both night sleep opportunities and night work are shared roughly equally between the two drivers. However, this is one parameter that, in practical terms, is difficult to ensure.

NTC notes that Canadian regulations (whose trans-continental distances probably most closely reflect Australian distances) currently require a minimum of 4 hours continuous rest.

The BFM proposal will not be set down in regulation because it is based on the assumption that two-up drivers operating under the BFM option would be well matched, well trained, and more experienced.

Although this requirement will be difficult to monitor, the recommended or mandatory short rest break will form a trigger for the lead driver to change over and start his continuous rest break. This will ensure that drivers rest when they are tired\(^{17}\) and no single driver continuously drives during circadian low points\(^{18}\).

### 3.5.3 Maximum Time in a Moving Vehicle Followed by a Minimum Stationary Rest

The purpose of setting this parameter is to compensate for the relatively poor rest gained in a moving vehicle and ensure drivers are well rested. NTC proposes that:

1. For two-up teams working under the Standard Hours option:
   
   a maximum of 42 hours in a moving vehicle before a stationary rest break of at least 10 hours.

2. For two-up teams working under the BFM option:
   
   a maximum of 72 hours in a moving vehicle before a stationary rest break of at least 10 hours.

Under the current (1999) regulations a two-up team can drive continuously for up to 6 days x 24 hours continuously, that is a total of 144 hours of work (or 72 hours in 6 days for each

\(^{15}\) FMCSA (1999). A US survey conducted in 1999 found that 78% of team drivers surveyed typically spent 4-5 hours in a sleeper berth en route. 56% of team drivers also reported daytime sleep to be just as restful as night time sleep.

\(^{16}\) Neale et al (2001). Many drivers commented that they sometimes are not tired when it is their turn to sleep or that they must first ‘wind down’ or relax after driving to be able to sleep.

\(^{17}\) Dingus et al (2001). Team drivers in this study commented that if ‘the team is driving in shifts of, say, 10 hours, the driver may get tired before his/her 10 hours are up; however, because it is the driver’s ‘turn’ to drive, he or she may feel compelled to continue even though tired.’

\(^{18}\) Between midnight to 6.00a.m. and 2.00p.m. to 4.00p.m.
individual), before a requirement to have a stationary rest break of 24 hours. The current Western Australian occupational health and safety regulations allow a maximum of 168 hours of work (or 84 hours in 7 days for each individual) in any 14 day period.

Fatigue expert advice maintains that two-up vehicles should stop after 36 hours continuous operation. However, this advice makes assumptions about the quality of rest in a moving vehicle being relatively poor due to a range of factors relating to comfort. The NTC view is that comfort can be optimised and the quality of rest significantly improved, thereby permitting an extension of the 36 hour period. As mentioned previously, there is no research based evidence to support this requirement.

Requiring two-up teams to take a stationary rest break after 36 hours may affect the productivity of some standard trans-continental two-up operations. This requirement would necessitate a stationary rest break on the outbound trip before reaching the destination point and would extend the total travel time on the outbound trip by 10-12 hours.

<table>
<thead>
<tr>
<th>Route</th>
<th>Total Time (Driving Time)</th>
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<tbody>
<tr>
<td>Perth to Melbourne (B-double)</td>
<td>48 hours (42.3 hours)</td>
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<tr>
<td>Perth to Sydney (B-double)</td>
<td>55 hours (48.4 hours)</td>
</tr>
<tr>
<td>Perth to Brisbane (B-double)</td>
<td>61 hours (54 hours)</td>
</tr>
<tr>
<td>Toowoomba to Darwin (triple)</td>
<td>48 hours (42.7 hours)</td>
</tr>
<tr>
<td>Perth to Brisbane (B-double)</td>
<td>61 hours (54 hours)</td>
</tr>
<tr>
<td>Perth to Sydney (double/triple)</td>
<td>55-63 hours</td>
</tr>
<tr>
<td>Sydney to Darwin (double/triple)</td>
<td>58 hours</td>
</tr>
<tr>
<td>Perth to Darwin (triple)</td>
<td>58 hours</td>
</tr>
<tr>
<td>Perth to Toowoomba (double)</td>
<td>58-65 hours</td>
</tr>
</tbody>
</table>

*(Actual travel times vary considerably depending on vehicle configurations, fuel stops, etc.)*

Under this proposal, a stationary rest stop would be required en route on some outbound trips, e.g. just after midway for trips Perth to Brisbane (54 hours), Perth to Sydney (55 hours), Perth to Toowoomba (58 hours), and on the outbound trip Perth to Melbourne (42 hours) just prior to reaching the trip mid-point. This would severely reduce the productivity of two-up operations on a number of standard transcontinental trips. It may also necessitate extensive breaks in inhospitable locations where the drivers are unable to get satisfactory rest.

The alternatives to a two-up operation in this case would be staged driving (relays), a more costly option, or reverting to single driver operations for the same trips, with a corresponding increase in the on road safety risk, and an increase in B-doubles on the interstate road network.

On the other hand, proper management of the human factors is vital for successful management of the fatigue risk in two-up operations. Concern has been expressed about the advisability of allowing two-up operations to operate under the proposed Standard Hours.

Given the important productivity issues and inherent safety benefits associated with two-up driving, NTC considered a range of factors in developing the above proposals:
• Under the BFM option, the requirement for accreditation under the National Heavy Vehicle Accreditation Scheme (NHVAS) will go some way to ensuring the on road fatigue risk is properly managed for this type of specialist operation. Any accredited operator will be required to incorporate good fatigue management practices into their day-to-day operations and address the issues of driver and team selection, driver training, despatching practices, and vehicle requirements.

• Discussions with two-up operators indicated that the majority of long distance two-up schedules would operate comfortably under the proposed parameters for BFM.

• It is questionable whether both drivers be fatigued after 36 hours on the road. 36 hours is in effect 18 hours non-consecutive driving for two-up drivers, say 3 x 6 hours stints. The quality of rest would have to be very poor for both drivers to require a lengthy (10+ hour) stationary rest break. One consequence may be that some drivers seek local delivery work when they are supposed to be resting.

• Since both drivers will need a place to rest, driver accommodation costs will drive up the cost of two-up operations. The net effect could possibly be higher freight rates, fewer two-up operations and more solo drivers undertaking these extremely long trips compounded by the current driver shortage.

• Existing operators may be tempted to cut corners elsewhere in schedules to meet delivery times to stay in business.

• Additional and more frequent rest areas would be required nationally to ensure quality rest at these remote locations.

• Two-up teams currently operate 144 hours continuously without a required stationary continuous rest break. The available crash data does not demonstrate a problem.

In considering what maximum period should be set for time in a moving vehicle, it is also important to determine what period outside the moving vehicle would facilitate restorative rest. Industry peak bodies and transport agencies put forward varying proposals on this parameter:

• **Roads and Traffic Authority NSW:** (based on Fatigue Expert Group advice) proposed a continuous stationary rest break of at least 9 hours after 36 hours driving. (fatigue management option not indicated).

• **Australian Road Train Association:** proposed a minimum continuous stationary rest break of 12 hours under Standard and a minimum 6 hours rest under BFM after 42 hours of work with a minimum 48 hours continuous rest in 14 days.

• **Australian Trucking Association:** proposed a minimum continuous stationary rest break of 7 after 55 hours or a rest break of 36 hours in every 7 day period with 18 hours being continuous and the balance taken in increments of at least 7 hours.

NTC notes that the current Western Australian occupational health and safety regulations require:

• at least 7 hours non work time in 24 hours which does not have to be continuous, and at least 48 hours non-work time in any 7 day period with a minimum of 24 hours continuous rest, the remainder to be taken in increments of at least 7 hours continuous stationary rest.
Potentially, this allows up to 100 hours in a moving vehicle before a requirement for a stationary rest break of 48 hours.

Fatigue expert advice indicates that the 10 hour minimum continuous stationary rest break may not be adequate for the BFM option. However:

- Under the BFM option, there will be a requirement that the two-up team is well matched and experienced with good fatigue management practices in place including a well planned schedule. This will provide the team with the opportunity for a restorative stationary rest break. This may take place on the road at any point up to the limit of 72 hours.

- Teams operating under BFM could reach their destination point before a return trip. Discussions with operators indicate that they would be likely to incorporate a longer continuous stationary rest break including a night rest at good quality facilities at this point in their trip.

- This parameter compares favourably with existing US regulations which require 10 hours off duty with a minimum 8 hour continuous rest break, with Canadian regulations which require minimum 4 + 4 hour continuous rest breaks and with the Western Australian requirement for a 7 hour rest break.

- Finally, the 10 hours is a MINIMUM stationary rest requirement and a significant improvement on the current regulations.

3.5.4 Stationary Rest Breaks in Seven Days

The purpose of setting this parameter is to ensure good restorative rest over a seven day cycle. NTC proposes that:

1. For two-up teams working under the Standard Hours option

   - A minimum 48 hours stationary rest for each driver in 7 days to be taken as follows:
     - at least 24 hours must be continuous stationary rest with a minimum 10 hours continuous stationary rest after 48 hours; and
     - any balance taken at driver’s discretion in minimum 7 hour periods of continuous stationary rest; and
     - to include at least two nights off in 14 days which must be consecutive (and two nights rest which can be non-consecutive).

2. For two-up teams working under the BFM option:

   - A minimum 48 hours stationary rest for each driver in 7 days to be taken as follows:
     - at least 24 hours must be continuous stationary rest with a minimum 10 hours continuous stationary rest after 72 hours; and
     - any balance taken at driver’s discretion in minimum 7 hour periods of continuous stationary rest; and
– to include at least two nights off in 14 days which must be consecutive (and two nights rest which can be non-consecutive).

These parameters provide a much greater opportunity for restorative rest and night rest than under the current regulations – continuous operation by a two-up team for 6 x 24 hour periods before an extended rest break of 24 hours.

The requirement for a single long continuous rest break e.g. 48 hours, would not be practical for two-up operations. In some cases drivers would perhaps (illegally) undertake local area work while they are supposed to be resting. Operators point out that current two-up schedules set a stationary rest break of 12+ hours at a point around mid-trip, before undertaking the return journey. From a practical point of view, splitting up this parameter would be more realistic.

Fatigue experts advise that schedules should permit two consecutive nights off on a regular basis (preferably weekly), to provide drivers with the opportunity to recuperate from the effects of accumulating sleep debt. This parameter allows two-up teams to include stationary night rests during the course of the working cycle. As a minimum, at least one night rest will be required every 7 days.

The Western Australian occupational health and safety regulations have taken the approach of breaking up the required 48 hours stationary rest break into manageable continuous stationary rest breaks more easily accommodated by operational schedules and taking into account the length of time drivers spend away from home on these long distance trips. Within WA most mid-point rest periods do not generally exceed 7 hours. The WA requirement, which was endorsed by a fatigue expert, is:

At least 48 hours non-work time in any 7 day period, with at least 24 hours of the 48 hours being continuous and the balance being taken in minimum 7 hour periods (this non-work time cannot be spent in a moving vehicle – the vehicle may be stationary or the time may be spent elsewhere).

The WA approach strikes a balance between safety and productivity. The NTC proposals seek to provide a similar level of flexibility. Under the NTC proposals, the team has the option of a long stationary rest break on the outbound trip, and/or at mid-point and/or on the return trip. If taken at mid-point, drivers would be more likely to take a longer continuous stationary rest break e.g. 24 hours, at the point of delivery of the outbound load depending upon their levels of fatigue.

This model would cater for the majority of two-up trips with some scheduling adjustments. It provides greater flexibility and would allow most long distance return trips to be completed with some margin left in schedules to handle unforeseen delays. In addition, current practice is to allow drivers a 48+ hour rest break at the end of the round trip before starting the two-up operational cycle again.

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19 FEG 2001
20 Williamson A et al. (2001) found that almost 47% of drivers surveyed breach working hours regulations in order to return home sooner.
21 Feyer, A-M et al (1997). The use of overnight rest, in combination with two-up driving, appeared to be the most successful strategy for managing fatigue across long distance trips.
22 Williamson A et al. (2001. This survey found that ‘Almost all drivers in each subcategory reported that the government should….allow greater flexibility in driving hours regulations in general’.
In the BFM option, drivers are required to take 4 nights off in 14, two of which do not have to be consecutive, and two of which must be consecutive, giving drivers an number of opportunities for restorative sleep during the course of their work cycle.

### 3.6 Two-up Under Advanced Fatigue Management

This option will provide for the anticipated small number of two-up operators whose operations may fall outside the BFM limits. These ultra long distance operations would benefit most from both the additional flexibility and the additional stringent fatigue risk management practices required under the Advanced Fatigue Management (AFM) option accredited under NHVAS. As discussed earlier, the NTC view is that no parameters will be set.

Under AFM, proposals are treated on a case by case basis, with individual terms and conditions set by approving authorities in each jurisdiction. The intention here is to accommodate exceptionally long distance trips and operations where the journey time is extended by additional factors such as un/loading, hook ups, drop-offs, vehicle configuration/re-configuration, and, in some cases, the additional time needed to reach legal starting/stopping points for road trains. All of these factors in combination result in an extended time on task for drivers and a higher fatigue risk operation.

Should an operator successfully negotiate a series of AFM parameters and conditions, they would be set out in the NHVAS accreditation agreement as indicated.

During the course of consultation, operators provided some examples of trips which would fall into this category.

**Example 1**

One two-up operator involved in discussions with the NTC runs probably the longest trip in any two-up operation in Australia, a Sydney—Perth—Darwin—Sydney trip. This operator works an 8 to 9 day cycle depending on when the two-up team starts their shift. The BFM proposal discussed above, operates on a 7 day cycle and wouldn’t accommodate this operation. Characteristics of this trip include:

- Hook ups at Dubbo to form road trains.
- Teams take a 36 hour break in Perth before undertaking the trip to Darwin.
- Teams take a 12 hour rest break in Darwin before travelling back to Sydney where they take a longer rest break of 48 hours or more.
- In all the round trip takes about 8 to 9 days.
- As with WA two-up operators, drivers working for this operator are not involved in any un/loading activities.
- This operator provides on site sleeping accommodation in depots for driver use.

**Example 2**

Another example of a schedule which may be better managed under the AFM option, is a Perth—Kununurra—Perth trip, which takes approximately 96 hours with a short turnaround time at destination point (Kununurra).

Other examples of ultra long distance travel times which may suit the AFM option include:
Perth to Sydney with additional activities 94 hours
Toowoomba to Darwin with additional activities 80-90 hours
Darwin to Brisbane with additional activities 84-99 hours.

In developing future AFM proposals for consideration by transport agencies, operators should be aware of the current proposed AFM (single driver) parameters. It is likely that transport agencies would take these into account when assessing two-up proposals:

- a minimum continuous break in a 24 hour period: six hours and to be specified in legislation;
- a minimum continuous 24 hour periods free of work: four periods in 28 days and to be specified in legislation;
- a minimum opportunity for night sleep (between 22:00 and 08:00): two periods in 14 days and to be specified in the NHVAS AFM accreditation agreement;
- a maximum hours work in 24 hour period: 16 hours and to be specified in the NHVAS AFM accreditation agreement. (note that nsw and victoria have proposed maximum work in 24 hour period as 15 hours);
- a maximum work in 14 days: 154 hours, with no more than 84 hours before a continuous period of 24 hours free of work and to be specified in legislation; and
- a maximum work in 28 days: 288 hours and to be specified in legislation.

Individual applications for accreditation under AFM in NHVAS will be assessed on their ability to manage the associated higher risk of fatigue.

3.7 Summary of Proposed Parameters

In summary, the parameters proposed for the Standard Hours option are:

- a maximum 12 hours work by any one driver in 24 hours;
- a minimum continuous rest break of 5 hours in 24 hours for each driver in a two-up team which can be taken in a moving vehicle; (set in regulations as explained above);
- a maximum of 42 hours in a moving vehicle before a stationary rest break of at least 10 hours; and
- in any 7 day period, a minimum 48 hours stationary rest for each driver of which

  at least 24 hours must be continuous stationary rest; with
  a minimum 10 hours continuous stationary rest after 48 hours; and
  any balance taken at driver’s discretion in minimum 7 hour periods of stationary rest; and
  this stationary rest requirement to include at least two nights 24 rest in 14 days (which must be consecutive).

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23 Feyer, A M et al. (1997) found that ‘where work practices kept the fatigue under control, such as on shorter two-up trips and two-up trips incorporating overnight stationary rest, breaks were more likely to be helpful’.
The parameters proposed for the BFM option are:

- a maximum **14 hours work** by any one driver in 24 hours;

- a minimum continuous rest break of **5 hours** in 24 hours for each driver in a two-up team which can be taken in a moving vehicle; (recommended only);

- a **maximum of 72 hours in a moving vehicle** before a stationary rest break of **at least 10 hours**; and

  **in any 7 day period, a minimum 48 hours stationary rest** for each driver of which
  
  at least 24 hours must be continuous stationary rest; with
  
  a **minimum 10 hours** continuous stationary rest **after 72 hours**; and
  
  any balance taken at driver’s discretion in minimum 7 hour periods of continuous stationary rest; and

  This stationary rest requirement to include at least two nights\(^{25}\) rest in 14 days (which must be consecutive).

These parameters, in combination would:

- (a) accommodate those transport operators who use two-up on an ad hoc basis only, allowing a small number of common two-up runs to be completed within reasonable scheduling\(^{26}\);

- (b) ensure that less well prepared two-up teams get a stationary rest break after a maximum 21 hours work each (if the work task is equally split) on the road; and

- (c) would allow operators to consider two-up as a viable alternative for ultra long distance trips\(^{27}\). Operators also have the choice of moving up into the accredited BFM option to obtain greater flexibility for their drivers providing more fatigue countermeasures are put in place.

It should also be noted that the limit of a maximum of 12 hours work in every 24 hours has a further in-built restriction in that work now includes driving, un/loading, queuing and all other work related activities.

\(^{24}\) Night rest to be taken between 22.00 – 08.00 hours.

\(^{25}\) Feyer, AM et al. (1995) ‘two-up driving in combination with a significant period during the trip of stationary rest probably at night, forms the most beneficial strategy for combating fatigue on very long distance trips’.

\(^{26}\) Beilock R. (1995). Found that 26% of 498 long distance drivers were operating on schedules that were in violation of HOS. Solo drivers were found to have much higher frequencies of violation-suspect and violation-inducing schedules than team drivers. Assuming 55 mph average speed limits, 28% of solo drivers but only 11% of the team drivers would have to violate HSR and/or speed limits to stay on schedule.

\(^{27}\) Dingus et al (2001). This study monitored both single and two-up drivers over a continuous 6-10 day period (240 hours approx). Results showed that single drivers were involved in four times the number of incidents of ‘very/ extreme drowsiness’ during the course of the study than team drivers and were more likely to push themselves to keep driving when ‘very tired’. Team drivers appeared to effectively rely on their relief drivers to avoid instances of extreme drowsiness while driving.
3.8 General Duty
One final point to note is under the general duty, there will be a specific requirement to manage the fatigue risk, e.g. where both drivers feel tired then the vehicle is must be stopped.

3.9 National Consistency in Two-up Regulations
Two-up operators in WA were keen to see a national approach to two-up regulation since the majority of two-up operations are based in that State. They wanted to see:

- the mandatory long continuous rest break of 48 hours broken up into more manageable stationary continuous rest breaks;
- a national set of parameters in place for two-up rather than have variations to two-up driving parameters in different jurisdictions. Ideally, operators would like to see the NTC proposed mandatory 10+ hours continuous rest break reduced to 7 hours as in the WA regulations in order to get consistency on a national basis. The WA regime shows that this can be done safely, however, operators did agree that the proposed BFM option could be accommodated on the majority of two-up interstate schedules; and
- the issue of separate documentation (maintenance of separate logbooks) to accommodate jurisdictional variation to regulations to be addressed.

At this stage, the NTC preference is to retain the minimum 10 hour continuous stationary rest requirement under Standard Hours (if retained) and under the Basic Fatigue Management option.

3.10 Transition Period
The concept of a transition period was originally aimed at managing the movement of solo drivers between accreditation schemes. For two-up operations, this concept would also need to cover the transition between single and two-up operations and vice-versa. In some cases, a lengthy transition period would not be deemed necessary for two-up operations.

- For example, in east coast operations where road trains operate out of and return to the legal starting point (e.g. Dubbo in NSW), after reconfiguration, the two-up team becomes two single drivers in order to deliver the load into Sydney or to the ports. These drivers are still operating within their legal timeframe but now as two single drivers.

In this case, the need for a transition period may be avoided if a road train is broken up into a smaller vehicle configuration at legal points and driven to its destination by a two-up team (still operating within the legal limit), and another relief driver takes the remainder of the load to the final destination point.

By contrast west coast two-up operators commented that most are dedicated two-up operations due to the geographical distances to be traversed intrastate and they do not make use of this practice.

- Two-up drivers will be working under parameters dictated by their NHVAS accreditation scheme, which will include in-built transition requirements for transfer between fatigue management schemes and for ad-hoc users of two-up by the Standard hours parameters.
In some cases a transition phase would be required where drivers are switching from solo operations to two-up and vice-versa. Some basic rules for transition:

- For solo drivers, a 1 x 24 hour rest break clears the Basic Fatigue Management bank of hours and the 84 hour week limit but drivers under both two-up and solo will still be required to have at least 4 x night rests in 14 days and 2 x 24 hour rest breaks in 14 days under solo or 1 x 24 hour rest breaks if operating as part of a two-up team.

- The general rule is that the driver must be operating within the legal parameters for the either solo or two-up BFM scheme.

- A driver migrating from solo operations to two-up will need to take at least 1 x 24 hour rest break before starting work as a member of a two-up team. This will be in addition to having, as a minimum, a 7 hours continuous stationary rest break in every 24 hours prior to taking that 24 hour rest break.

- A separate paper outlining the proposed transition arrangements in more detail will be made available shortly as part of the release of the Heavy Vehicle Driver Fatigue policy proposals.

4. PROPOSED ADDITIONAL COUNTERMEASURES FOR TWO-UP OPERATIONS

With two-up operations, management of the additional social and human factors are necessary for a successful and safe operation. The issues of driver self-selection (individuals’ preference for this type of operation), team compatibility (trust, confidence in partner, reliability, consideration of resting partner) driver training, despatching practice and pre-trip preparation must be addressed. While it is recognised many dedicated two-up operators are already addressing these issues, it is important to ensure these countermeasures are in place for these higher fatigue risk operations.

Two-up operators operating under BFM and AFM will be required (through their accreditation requirements) to incorporate additional measures to ensure these important issues are well managed. These measures will be addressed through channels such as:

(a) the incorporation of recommendations into the Guidelines for Managing Heavy Vehicle Driver Fatigue and bulletins addressing fatigue management, driver health and medical issues; and

(b) the incorporation of requirements into NHVAS accreditation standards, operator awareness raising, driver education and training materials.

Note guidelines for minimum continuous rest breaks under BFM will also be included in these materials rather than in legislation.

The following table sets out the proposed requirements. These have been developed from limited discussion with operators and it is recognised that they may need some clarification or expansion before being built into accreditation requirements.
### Countermeasures

#### Vehicle Selection & Sleeper Berth Design

<table>
<thead>
<tr>
<th>Proposed Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Sleeper berths should have auxiliary air conditioning units.</td>
</tr>
<tr>
<td>(ii) Sleeper berths should have separate suspension.</td>
</tr>
<tr>
<td>(iii) Sleeper berths should</td>
</tr>
<tr>
<td>o Be clean and tidy;</td>
</tr>
<tr>
<td>o Have adequate noise and heat insulation;</td>
</tr>
<tr>
<td>o Have a good quality mattress which should be replaced at least annually.</td>
</tr>
<tr>
<td>o Have dual escape hatches (see WA Code of Practice).</td>
</tr>
</tbody>
</table>

#### Driver & Team Selection

<table>
<thead>
<tr>
<th>Proposed Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Drivers to self-select for this type of operation.</td>
</tr>
<tr>
<td>(ii) Two-up operators to implement a pre-employment screening process.</td>
</tr>
<tr>
<td>Selected drivers must be able to sleep in a moving vehicle. Drivers who cannot obtain restful sleep in a moving vehicle should not be involved in two-up.</td>
</tr>
<tr>
<td>(iii) Two-up operator to ensure potential applicants for two-up are carefully screened. Two-up operators to thoroughly check applicants' backgrounds and references. Referees to be asked to provide an assessment of the drivers experience and skills.</td>
</tr>
<tr>
<td>(iv) Two-up operator to assess married teams as individuals.</td>
</tr>
<tr>
<td>(v) Two-up operator to test applicants for suitability for a two-up operation. Newcomers to two-up to be matched up with a more experienced driver for a probationary period. During this period a number of runs to be undertaken as a team. The experienced driver to provide feedback on the new drivers' skills. This process will check if the applicant has the right attitude and behaviours for two-up.</td>
</tr>
<tr>
<td>(vi) Two-up operators to ensure that drivers nominate their choice of two-up driving partner (trustworthiness, reliability, consideration). Two-up operator to take time in matching the suitable applicant with a suitable partner.</td>
</tr>
</tbody>
</table>

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28 Dingus, TA et al (2001) found greater attention needs to be paid to reducing the amount of vibration and noise that invades the sleeper berth.

29 As a separate task ADR 42 may need to be revised, however, it should be emphasised that the focus of an ADR is to address technical safety requirements.

30 Dingus, TA et al (2001). *Almost without exception, drivers seemed to either love or hate team driving*.

31 Henderson, M. (1990). *Drivers whose personal preferences, psychological profile, or physiological responses to the rest/work cycle make two-up driving especially difficult, stressful or fatiguing for them, should never be required to operate vehicles in this way*.

32 Hanowski et al (2001) found that a relatively small number of drivers were responsible for a large number of fatigue related critical incidents.

33 Dingus, AT et al (2001). *Team drivers appeared to drive much less aggressively, make fewer errors, and rely effectively on their relief drivers to avoid instances of extreme drowsiness while driving….team drivers must be both considerate of their resting partner and trustworthy with regard to their driving ability.*

34 Dingus, TA et al (2001) *team drivers must be both considerate of their resting partner and trustworthy with regard to their driving ability.*
### Countermeasures

<table>
<thead>
<tr>
<th>Proposed Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>(vii) Two-up operator to periodically review teams to assess if they are working well together.</td>
</tr>
</tbody>
</table>

#### Driver Training

(i) Two-up operator to ensure two-up applicants have completed a module in fatigue management training.

(ii) Driver training to include education on managing fatigue on the road and on napping techniques.

(iii) Driver training to provide instruction on how to handle unforeseen delays including rescheduling due to unforeseen delays.

(iv) Driver training to provide information on the long term effects of stimulant use.

#### Trip Preparation

(i) Despatching practice: two-up operator to ensure two-up team is provided with sufficient advance pre-trip notification. A two team needs to be notified far enough in advance, preferably prior to the weekend off-duty period, for drivers to plan their trip and arrange who will be lead driver.

(ii) The Guidelines for Managing Heavy Vehicle Driver Fatigue to advise drivers to get sufficient rest on days off prior to a long trip.

(iii) The Guidelines for Managing Heavy Vehicle Driver Fatigue to advise that two-up drivers as a rule should not get involved in loading prior to a long distance trip.

(iv) Two-up operator and drivers to ensure that trip plans include where and when to take rest breaks and changeovers.

(Note: NSW recently amended OH&S legislation will require trip plans for those operators operating out of NSW. The Guidelines for Managing Heavy Vehicle Driver Fatigue and the NHVAS business rules to provide advice to this effect.

(v) Two-up team to ensure that the night driving task (hours between midnight and 6:00am) is shared equally.

The Guidelines for Managing Heavy Vehicle Driver Fatigue and the NHVAS business rules to provide advice to this effect.

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35 FMCSA (1999). ‘It appears that drivers are not very good at assessing their own levels of alertness; there was a tendency for drivers to rate themselves as more alert than performance tests indicated.’

36 Hanowski et al (2001) and Mabbott et al (2005) both suggest that some of the fatigue experienced by drivers is brought to the job through poor preparation rather than being caused by the job.

37 Dingus, TA et al (2001). Drivers commented that coming back to work after a few days off could be problematic if the team did not decide beforehand who would drive first.

38 Williamson, A et al (2001). This survey found that nearly half of drivers surveyed reported getting less than six hours sleep in the 10 hours before their last trip and one in eight drivers reported getting no sleep in the 10 hours prior to their last trip.

39 Feyer, A-M et al (1995). For two-up drivers, fatigue at the beginning of the trip was clearly influenced by the amount of work they did in the ten or so hours before starting to drive, such that they started the trip more tired than single drivers. ‘Involvement in yard-work and loading activities is the second factor likely to increase pre-trip fatigue for two-up drivers.’
### Countermeasures

<table>
<thead>
<tr>
<th>Countermeasures</th>
<th>Proposed Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Driver Health</strong></td>
<td>(i) The <em>Guidelines for Managing Heavy Vehicle Driver Fatigue</em> and the <em>Assessing Fitness to Drive Guidelines</em> (2003 Austroads standard currently under review) and information bulletins to provide drivers with regular information on driver health issues (e.g. guidelines on managing weight, healthy diet and the importance of regular exercise).</td>
</tr>
<tr>
<td></td>
<td>(ii) Two-up operators to ensure their drivers undergo regular medicals providing evidence of fitness to drive.</td>
</tr>
<tr>
<td></td>
<td>(iii) Two-up operators to ensure that drivers are educated about the use of stimulants(^\text{40}).</td>
</tr>
<tr>
<td><strong>Rest Areas for Heavy Vehicles</strong></td>
<td>States and Territories to develop additional rest area facilities on the national road network for long distance heavy vehicle configurations.</td>
</tr>
</tbody>
</table>

\(^{40}\) Jurisdiction based roadside testing is being considered by a number of States and being rolled out in Victoria.
5. REFERENCES


## APPENDIX A  EXPLANATION OF PARAMETERS

### Table 1  Standard Hours Parameters for Two-up Driver (7 day cycle)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Operating Limit</th>
<th>Rationale – Conservative Parameters for new Entrants, Inexperienced or Ad-Hoc Users of Two-Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum continuous rest break in a 24 hour period</td>
<td>5 hours (may be taken in either a moving or stationary vehicle)</td>
<td>Conservative approach taken by mandating when rest should be taken for two-up teams, however, the risk is reduced by the presence of a second driver. A MINIMUM rest break of 5 rather than 7 hours is stipulated since consultation indicates that two-up drivers manage with shorter but more frequent rest breaks and the additional 60 minutes factored into the 7 hour continuous rest break for single drivers is not necessary here. A longer period may also risk increasing the fatigue of the other driver.</td>
</tr>
<tr>
<td>Minimum opportunity for night sleep (between 22.00 – 08.00)</td>
<td>4 x nights off in 14 2 of which must be consecutive, AND 2 single nights off which do not have to be consecutive</td>
<td>Ensures AT LEAST 2 consecutive stationary nights rest in 14 days but provides extra flexibility for two-up schedules by allowing drivers to schedule their additional stationary night rest breaks when required.</td>
</tr>
<tr>
<td>A minimum 1 x 24 hour continuous period free of work for each driver</td>
<td>1 in 7 days</td>
<td>Ensures at least a MINIMUM of one long period of recuperative rest in any 7 days. Can be extended. An additional 24 hours rest is also proposed to address cumulative sleep debt although this may be taken in increments of at least 7 hours.</td>
</tr>
<tr>
<td>Maximum hours work in 24 hours for each driver</td>
<td>12 hours</td>
<td>Consistent with requirement for single drivers operating under standard hours. Enables maximum vehicle productivity.</td>
</tr>
<tr>
<td>Maximum hours work in 7 days for both drivers</td>
<td>60 hours</td>
<td>Ensures AT LEAST 108 hours rest in 7 days.</td>
</tr>
<tr>
<td>Maximum hours work for both drivers before a continuous stationary rest break</td>
<td>42 hours in a moving vehicle before a minimum continuous stationary rest break of 10 hours</td>
<td>More restrictive parameter since ad hoc users of two-up may not adequately address the important social and human factors intrinsic in this type of operation.</td>
</tr>
<tr>
<td>Minimum total stationary rest in 7 days</td>
<td>48 hours (e.g. 24 + 10 + 7 + 7)</td>
<td>Allowance for recuperative rest but not entirely continuous due to countermeasure of relief driver. Split provides additional flexibility.</td>
</tr>
<tr>
<td>Minimum short rest breaks</td>
<td>As for single drivers</td>
<td>Prescribed in regulation.</td>
</tr>
</tbody>
</table>
### Table 2 Basic Fatigue Management (BFM) Parameters for Two-up Driver (14 day cycle)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Operating Limit</th>
<th>Rationale – Additional Flexibility for Experienced Two-Up Operators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum continuous rest break in a 24 hour period</td>
<td>Accreditation guidelines to state that a MINIMUM period of 5 hours continuous rest should be taken.</td>
<td>Mandating when rest should be taken for two-up teams may have the reverse effect to alleviating fatigue. Consultation indicates that experienced two-up drivers manage with shorter but more frequent breaks. <strong>Should be advisory not mandatory</strong> since may be alternatively managed. The shorter time period reduces time on task for both drivers.</td>
</tr>
<tr>
<td>Minimum opportunity for night sleep (between 22.00 – 08.00)</td>
<td>4 nights off in 14 2 of which must be consecutive, AND 2 single nights off which do not have to be consecutive</td>
<td>Consistent with BFM for solo drivers. Ensures AT LEAST 2 consecutive stationary nights rest in 14 days but provides extra flexibility for two-up schedules by allowing drivers to schedule their additional stationary night rest breaks when required.</td>
</tr>
<tr>
<td>A single continuous 24 hour period free of work for each driver</td>
<td>1 in any 7 day period</td>
<td>Ensures at least a MINIMUM of one long period of recuperative rest in any 7 days. Drivers have the option of extending this rest break.</td>
</tr>
<tr>
<td>Maximum hours work in 24 hours</td>
<td>14 hours</td>
<td>Consistent with BFM requirements for single drivers. Enables maximum vehicle productivity.</td>
</tr>
<tr>
<td><strong>Maximum hours work in 14 days</strong></td>
<td>140 hours</td>
<td><strong>Ensures AT LEAST 196 hours rest in 14 days.</strong></td>
</tr>
<tr>
<td>Maximum hours work for both drivers before continuous stationary rest break</td>
<td>72 hours in <em>a moving vehicle</em> before a minimum continuous stationary rest break of 10 hours</td>
<td>Consultation indicates this will cater for the majority of existing two-up operations with some margin for unforeseen delays. Ensures recuperative rest at mid point or before during long distance round trips. Some operators are looking for a shorter continuous rest break. See 3.6</td>
</tr>
<tr>
<td>Minimum total stationary rest in 7 days</td>
<td>48 hours (e.g. 24+ 10+ 7+ 7)</td>
<td>Allowance for recuperative rest but not entirely continuous due to countermeasure of relief driver. Split provides additional flexibility.</td>
</tr>
<tr>
<td>Minimum short rest breaks</td>
<td>As for single drivers. Recommended.</td>
<td>Consultation and research indicate two-up drivers manage this well.</td>
</tr>
</tbody>
</table>

* work = driving + non-driving and can be time spent in either a moving or stationary vehicle