Preface

The Vehicle Licensing Reform (VLR) project is a joint project undertaken by the Ministry of Transport and the NZ Transport Agency. It looks at the Annual Vehicle Licensing (AVL), Warrant of Fitness and Certificate of Fitness (WOF and COF) and Transport Services Licensing (TSL) systems. The primary objective of the project is to reduce compliance and administrative costs, while achieving similar or improved safety and environmental outcomes.

This report documents the national cost benefit analysis (CBA) used to inform the development of policy options for changing the model for delivery of heavy vehicle inspections and the frequency of COF. The report covers most of the core components of the regulatory impact assessment required by the Treasury.

Important qualifications

The CBA analysis assumes implementation of change addresses the following issues:

- access to training for COF inspectors working for repair organisations
- application of robust audit and monitoring for all organisations approved to be inspection providers
- removal of prescriptive site standards not relevant to achieving robust inspections, and introducing more performance based approach for standards related to the undertaking of inspections.
Acknowledgments

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Executive Summary

This document summarises the cost-benefit appraisal (CBA) of the certificate of fitness (COF) reform options that are one component of the Vehicle Licensing Reform proposals.

Two aspects of the COF reform options have been evaluated: market contestability and inspection frequency. The ‘inspection frequency’ dimension considers assigning a range of different COF frequencies to operators depending on factors (that are to be established by the NZ Transport Agency) relating to the level of operator safety performance. The ‘market reform’ options would allow the approval of COF testing organisations that may operate vehicles and/or conduct maintenance, service and repair.

Status quo market structure and rationale

A defining characteristic of the current COF provision model is that repairers are not approved to issue COFs; vehicles need to travel to vehicle testing stations that do not do repairs (called Transport Service Delivery Agents, or TSDAs). The intent of this COF provision model appears to be that ‘independent’ inspectors are less likely than repairer inspectors to be lenient because they lack potential conflicts of interest.

All service providers have profit and other incentives that might not always align with delivering robust inspections, however. There is a need to ensure that there is adequate regulatory supervision, such as continuous monitoring, audits and enforcement. The CBA has made provision for these costs based on the NZ Transport Agency’s existing audit and enforcement experience.

Market Reform – key assumptions and results

The market reform option represents the most substantive change to the status quo. It was modelled for COF-B (heavy vehicles), and not for COF-A (light commercial vehicles) due to time constraints.

There is significant uncertainty in the CBA estimates. They involve assessing scenarios of changes to market structure and transport operator behaviour. The key assumptions that most affect the CBA results are:

1. *The future TSDA market share:* This is assumed to be between 10 and 20 percent in the long-term, based on the outcome of the already open WOF inspection market and survey and other feedback from market participants.

2. *Duplication:* The proportions of vehicles that currently have maintenance inspections undertaken in advance COF inspections (referred as pre-COFs throughout this document). The low to high range is 40 to 80 percent, based on feedback from repairers, operators and the wide provision of these services.

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1 “Pre-COFs” are a COF-equivalent check done before a formal COF inspection. They can be undertaken by repairers or independent inspection stations, and may be part of an overall maintenance programme or induced by the requirement to have a COF. They minimise the risk of failing a COF and being further inconvenienced as well as the risk of being scored negatively in the Operator Rating System from a fail.
Over 75 percent of the variability of the results is driven by the two key assumptions outlined above. The net present value (NPV) estimates for the COF-B market structure change range between $160 million and $460 million NPV, with a mid-point estimate of $300 million. The annualised savings are $14 million, $26 million and $41 million for the low, mid-point and high points respectively. The results are driven by the reforms removing layers of inconvenience and duplication costs to truck operators.

There are benefits not included in the appraisal due to data issues. These include productivity loses and broader business disruption costs from vehicles failing an independent COF inspection and being taken off the road to be repaired and then driven to be rechecked at a TSDA again. Integrated inspector/repairers would address faults at the same time as repairs and hence reduce these disruption costs.

Cost-benefit analysis — COF-B inspection frequency options

Assuming only independent testing stations are allowed to continue to inspect (i.e. the current market structure), the net present value of allowing, for example, 25 percent of trucks subject to COF-B to undertake annual inspections (whilst the rest stay at 6 months) is between about $46 million to $67 million, with a mid-point estimate of about $55 million (annualised\(^2\) value of $4 million to $6 million, with mid-point $5 million).

If the market contestability option was also undertaken, the scope for benefits from frequency changes is substantially lower than $55 million, and depends on which operators are being awarded the frequency concession and why.

Cost-benefit analysis — COF-A

The COF-A (light commercial vehicles) market is around one tenth the size of the COF-B market based on revenue turnover. If it was included in the modelling, the reported reform benefits would be higher. COF-A operators would receive similar kinds of benefits as COF-B operators, such as reducing the inconvenience costs when vehicles fail and require repair and then rechecks. Similarly, there would also be benefits from the frequency option for COF-A, although significantly scaled down to reflect the different expenditure involved.

Safety impact assumptions

No increased crash cost is estimated for the market reform option, as it is assumed that monitoring and auditing of inspectors ensures that inspection quality is maintained and hence no safety issues arise. We have tested relaxing this assumption, and in the context of very small numbers of crashes, it would take some bold assumptions to suggest a change in who provides inspection could have such a detrimental effect on quality as to double the crash rate and thereby negate the benefits of opening the market.

Rather, it can be argued that there would be an improvement in safety arising from integrated repairers/inspector organisations. Bringing these parties together would close the current knowledge gap for repairers around what is required to meet COF quality standards, and mean that regular vehicle servicing would identify more safety related COF issues.

\(^2\) These annual estimates are calculated using annuities; i.e. the sum over 30 years of the uniform benefit discounted at 8 percent equals the respective NPV. The NPVs are rounded to the nearest multiple of $5 million, given the estimates are illustrative.
The frequency option analysis assumed no increase in crash costs, as only operators that pose no elevated risk are awarded the concession. It is important to note that this assumes the implementation (still in the early design phase) is successful, and only operators with a proven safety record get an extended frequency.

**Conclusion**

The analysis of the costs and benefits arising from repairers entering the inspection market involves managing significant data uncertainty. This uncertainty comes from the limited information on the extent of the pre-COF market, the need to take a view on the possible future market shares, and the length of any transition to the new market state. These uncertainties have been addressed through the use of a scenario approach, varying assumptions and thus generating a wide range of results – low, high and mid-point scenarios.

While the range of the results is broad, all of the scenarios produce substantial net benefits for New Zealand from allowing the entry of repairers into the inspection market. There are also benefits from introducing a variable COF frequency, provided this is introduced in a manner that does not have an adverse effect on safety. If the inspection market is not opened to repairers, the benefits of variable frequency for transport operators are higher, reflecting the inefficiency of the existing market structure.
1. Problem definition

Heavy vehicles, and light vehicles used for a transport service (such as taxis), are inspected for a Certificate of Fitness (COF) every six months to make sure they meet safety standards. Heavy vehicles (which are greater than 3.5 tonnes) have different inspection requirements than light vehicles, and they undergo COF-B; the rest require a COF-A (which in the majority of instances is similar to a WOF).

Table 1 shows that of the total COF fleet of 205,000 vehicles in 2011, about 150,000 (73%) were heavies and 55,000 (27%) were light vehicles.

Table 1 Number of vehicles and COF inspections July 2011–June 2012

<table>
<thead>
<tr>
<th>2011</th>
<th>COF-A (ie for light vehicles)</th>
<th>COF-B (ie for heavy vehicles)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unique vehicles</td>
<td>55,000</td>
<td>150,000</td>
<td>205,000</td>
</tr>
<tr>
<td>First time inspections</td>
<td>86,000</td>
<td>278,000</td>
<td>364,000</td>
</tr>
<tr>
<td>Total inspections (incl rechecks)</td>
<td>102,000</td>
<td>363,000</td>
<td>465,000</td>
</tr>
<tr>
<td>1st time fail rate</td>
<td>19%</td>
<td>32%</td>
<td>29%</td>
</tr>
</tbody>
</table>

Note that volumes are rounded to nearest thousand.

A defining characteristic of COFs is that repairers are not approved to issue them; vehicles are required to travel to vehicle testing stations that do not do repairs (called Transport Service Delivery Agents, or TSDAs). The intent of this COF provision model is that ‘independent’ inspections are less likely to be lenient because of potential conflicts of interest, and thereby ensures vehicle safety standards are met.

This provision model imposes significant regulatory burdens and duplications, however. These arise from additional investment in equipment and facilities, duplication of COF or COF-like inspections, additional travel costs and waiting times, including for rechecks, and associated business disruption costs. Engagement with industry stakeholders has found that operators and repair agents are increasingly investing in specialist COF testing equipment required by the NZ Transport Agency, including ‘roller brake machines’, pits, and load simulation devices. This includes small repair sites and operators, including those in remote areas.

Information withheld because it would unreasonably prejudice the commercial position of providers. (Section 9 (2) b (ii) of the Official Information Act).

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3 For testing truck brakes in conditions similar to how they are used on the roads in practice.
Another characteristic of COF regulations is prescriptive standards for inspection premises and equipment. Many of these standards relate to aspects unrelated to the effectiveness of a given inspection, such as minimum dimensions for the building, driveways, inspection pits, turning circles etc.

Problem: Current prescriptive standards for inspection premises and equipment may cause undue costs to existing inspection organisations that are passed on; create a barrier to entry for competition; and suppress innovation⁴

Currently, COFs are required every six months, but where such periodic inspection is used overseas the frequency is typically once a year. Six monthly inspections may be too onerous and there is a question as to whether COF regulatory burdens could be reduced by relaxing inspection frequency to once a year, provided road safety outcomes are the same or similar. On the other hand, some vehicle operators may be reliant on COFs for maintaining safety and more frequent COF inspections may be more beneficial overall.

Problem: Current COF frequency requirements may not be appropriately targeted to risk

Another problem is that the WOF reform options and some aspects of the COF options (frequency and accreditation) may reduce the commercial viability of TSDA inspection sites. This may reduce geographical coverage of COF sites and affect prices and customer service.

Problem: The potential WOF reform options may escalate the inconvenience/compliance costs to business because of reduced service levels from fewer sites

Information withheld because it would unreasonably prejudice the commercial position of providers. (Section 9 (2) b (ii) of the Official Information Act).

⁴ Some truck service centres are moving to technologies that do not meet current mandatory requirements for COF sites. Moreover, the move to High Productivity Motor Vehicles (HPMVs) allows for longer trucks that were not anticipated when the current requirements were determined, which means the current required dimensions for sites is outdated.
2. Policy rationale and market research findings

In this section of the report we outline:

- the policy rationale for the existing regulation for the COF inspection market and the implications for the CBA
- an overview of some key characteristics of the heavy transport sector that informs and shapes the analysis
- sources of information and market research findings that informed the CBA.

2.1. Existing policy rationale

In designing the CBA methodology it was important to understand the rationale for the existing policy to restrict access to the COF inspection market. The rationale for the current inspection model is not well documented. Indeed, there may be no clear previous policy rationale of what we observe as the COF model today. It may be a reflection of historical events and institutional path dependence, rather than grounded in policy rationale. The dominant inspection provider, VTNZ, was once a government division, which was privatised in 1999. Historically, governments may have been the only party trusted to inspect or perhaps New Zealand followed the UK lead where a government agency still inspects heavy vehicles.

Some plausible policy rationales to support the model put forward include:

- **Natural monopoly**: there may be large economies of scale and associated delivery efficiency would be lost in the event of a more open market because there are high costs to enter the market and set up

- **National coverage**: a large provider with scale economies enables cross-subsidisation of more remote sites that are not otherwise commercially viable

- **Independence**: testing station independence avoids conflicts of interest, thereby ensuring robust inspections and safe vehicles on the road; furthermore the cost of auditing of non-independent inspectors is prohibitive.

From our stakeholder engagement and analysis of regulatory supervision costs, we have come to reject the idea that these rationales justify retaining the status quo policy.

**Natural monopoly**

We have found that inspection does not have natural monopoly characteristics. The cost for the necessary specialist inspection equipment is not prohibitively expensive (perhaps in the order of $100,000 over and above investments already made in buildings. As a matter of course the heavy vehicle repair and servicing industry has to invest in buildings and equipment. Many repairers and some operators themselves are acquiring these technologies. While there may be a degree of economies of scale in inspection activities, it does not prohibit smaller scale organisations from investing. Moreover, a relevant alternative lens is economies of scope rather than scale if inspection can be integrated with servicing, in part reflected in convenience cost savings to customers from having a “one-stop” shop.
**National coverage**

We consider obtaining geographic coverage does not require a restricted market. Where there are trucks, there are servicing facilities. Many of these facilities could, for the reasons described above, obtain the necessary skills and equipment to undertake inspections. Also, remote areas are already served by mobile brake testing equipment, which is well utilised and priced at rates higher than main stations. There is no reason to suggest this could not continue in a more open inspection market.

**Independence**

The potential need for independence is a more nuanced issue.

The term “independent” is used to refer to a separation of functions. Inspection delivery is separated from repair and service agents and from control by transport operators. It is a regulatory model intended to help ensure that inspections are free of any conflict of interest that could unduly influence inspection outcomes.

It is beyond the purpose and scope of this CBA report to consider the details of alternative inspection models. We note, however, there are a diverse range of inspection models operating internationally and they often do not see the need to separate repairs and inspections.\(^5\) Also, it should be noted that the independent testing station model is itself not free of conflict of interest. When inspection companies compete for business there is a risk they put priority on cost minimisation and profit, and hence focus on throughput thereby potentially degrading inspection quality. The TSDA model does not avoid the need for investment in monitoring and auditing.

**The regulatory problem**

Conflicts of interest need to be effectively managed to ensure robust inspections, while imposing the least burden on business.

The most likely conflict cited in literature arises from cross-selling incentives. One risk is repairers require operators to undertake unnecessary repair work or withhold their COFs. However, this ‘over serving’ is not a safety issue, and arguably transport operators’ are knowledgeable consumers with countervailing market power. The other risk is that operators ‘shop around’ repairers to find those who offer more lenient inspections, or put budgetary pressure on repairers to under-serve.

**Managing leniency risks**

These risks of leniency are real but can be avoided or mitigated:

- business disruption to operators shopping around for leniency would not make this a common practice
- market motivations, including reputational brand value for repairers and operators
- monitoring, audit and quality assurance systems, and on-road enforcement

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\(^5\) For example, repairers can undertake inspections in many American states, some Australian states, and in Germany and the Netherlands.
Based on our market enquiries, some national repairers operate policies that trucks do not leave their premises unless they are COF compliant, and in one case even ‘impound’ vehicles with a serious fault. This appears to be motivated by professional liability concerns arising from damages associated with any inadequate repairs, reputational branding and customer dissatisfaction if on-road enforcement (whereby around 90,000 trucks annually are stopped) identifies a fault soon after a vehicle has been serviced.

While the examples above indicate market incentives are broadly aligned with desired safety outcomes, there is still the risk of lenient inspections where commercial pressures arise in some instances. Thus it would be prudent to require audit of inspections and inspection systems. We have examined the costs of implementing expanded audit and quality assurance systems, and these are included in the cost-benefit evaluation.

We note that under the current regulatory regime, the NZ Transport Agency has the power to suspend or revoke approvals for COF inspections. This threat of losing business, sitting alongside commercial incentives to find faults, provides substantial motivation for high quality inspections to be provided by repairers. Accordingly, we have held safety outcomes constant; however, we have undertaken some scenario analysis to test sensitivity of the model.

2.2. The heavy commercial vehicle industry

The road freight sector has an estimated annual turnover of $6 billion and thus makes a substantial contribution to the economy. The sector is diverse and varies from long-haulage freight operators that operate trucks nearly 24/7 through to situations of very limited seasonal use by, say, farmers.

Figure 2 The “50:10 rule”: share of fleet by share of fleet travel using 2010 data

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6 Source: Road Transport Forum
This diversity is reflected in the dichotomous picture of travel, with a small portion of the trucks doing most of the mileage on roads. This is shown in Figure 2, whereby 10 percent of the fleet do half of the mileage, and half the fleet do 10 percent of the mileage — this could be called the “50:10 rule”. This diversity also implies a broad spectrum of vehicle servicing frequencies, which are not possible to accurately model. We thus developed a scenario approach to the modelling informed by market research.

We sought to understand the different motivations and contexts of vehicle operators by engaging the industry with questionnaires and interviews. These are discussed in the next section.

2.3. Market research

The table below sets out the sources of information used for the CBA:

Table 3 List of information sources and their use in the cost-benefit appraisal

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<thead>
<tr>
<th>Information Source</th>
<th>Use in CBA</th>
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<tbody>
<tr>
<td>NZTA’s COF database</td>
<td>Site names and locations, volumes of COF inspections by vehicle types (including rechecks), pass/fail rates</td>
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<tr>
<td>Technical Advisory Group (TAG) meetings and individual members’ inputs</td>
<td>Data on cost and price estimates, site locations, volumes of inspections</td>
</tr>
<tr>
<td>NZIER survey of operators undertaken as a part of this work. (The survey was advertised to industry by the Road Transport Forum and National Road Carriers) 13 respondents</td>
<td>There were a limited number of responses. However they provided the starting point for engaging people in the industry with targeted phone interviews. The survey gave assurances that responses would be anonymous</td>
</tr>
<tr>
<td>Approximately 20 discussions with industry stakeholders (operators, repairers/service agents)</td>
<td>Informed the understanding and judgement of issues. Descriptions of industry contexts, business motivations, the willingness to enter the COF inspection market, cost and price estimates etc Some of the industry participants spoke on condition of anonymity</td>
</tr>
<tr>
<td>National Road Carriers COF survey (2010). 68 respondents</td>
<td>Assorted information on wait times, travel distances, ability to schedule inspections around work requirements etc</td>
</tr>
<tr>
<td>TERNZ Transport Research: The case for the High Performance Operator</td>
<td>Provided some information on monitoring and audit costs and contextual information explaining motivations of some operators in to invest in high standards of vehicle maintenance</td>
</tr>
<tr>
<td>NZTA staff</td>
<td>Informed estimates of the cost and feasibility to audit non-TSDAs for COF inspections</td>
</tr>
<tr>
<td>NZIER (2002) <em>Certificate of Fitness testing; Commercial and regulatory models for provision of certification services, Report to LTSA</em></td>
<td>Economic framework modelling and general background</td>
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2.4. Key findings from industry interviews

The transport industry is investing in testing equipment already for many reasons

Engagement with industry stakeholders indicates that operators commonly have vehicles inspected prior to being presented for a formal COF check. These inspections are progressively being done to a COF standard, and not just by specialist repair sites but by operators themselves. These are described in the report as ‘pre-COFs’. Many repairers and operators are investing capital in inspection pits, roller brake machines (RBMs), and load simulation devices (all of which are the principle costly items strictly necessary to do a COF-equivalent inspection). Truck operators that travel large distances are undertaking maintenance frequently, such as every one to two weeks, to a standard comparable to COF (except for the laden roller brake test, which may occur, say, every three to six months).

The impetuses for these developments are:

(a) to reduce the probability of failing a COF, which means the vehicle is effectively ordered off the road until it is made road worthy, and the associated inconvenience costs for repairs, and then recheck(s)

(b) to reduce the probability of a fail that counts against operators in the NZ Transport Agency’s Operator Ratings System (ORS)

(c) to willingly ensure the safety performance of vehicles to minimise crash risks to people generally, and to minimise risks to the brands of end-consumers’ and/or operators’ and/or the repairers themselves

(d) to maximise performance levels and life from truck components

(e) to reduce any legal liability associated with any potential crashes.

A further motivating factor is the fact that current inspection sites are often either too busy to do what is called a “pre-COF” inspection, or are not located sufficiently close for it to be convenient.

The costs of RBMs are in the vicinity of $85,000. The cost to obtain load simulation devices starts from about $10,000, and increases to about $15,000 to $40,000 for more sophisticated load simulation systems. These prices could decrease in real terms over time with further technological improvements and competition.

We have found that isolated operators in particular are installing RBMs or are future-proofing for them. This is because the cost of failing a COF is disproportionately high for them, given the long distances they need to travel and the risks associated with being stranded at long queues at testing stations. This, alongside the ready availability of mobile RBMs, means that the risk that isolated areas would be stranded with no ability to undertake COF-inspections if the market was opened up is potentially low.

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7 Ie as distinct from what the NZTA necessitates being in place that do not relate to the effectiveness of a COF inspection, such as the size of the inspection site.

8 Ie when upgrading inspection pits they may design and prepare to accommodate them in future.
There is interest from the repair/service industry to undertake COFs

We spoke to some of the national branded truck servicing businesses, and they have an interest in being able to issue COFs. They indicated they would need to understand the commercial viability if the opportunity became concrete, but they acknowledged that they would need to enter quickly if their key competitors entered. A primary factor that would slow the rate of market entry would be the acquisition of certified COF inspectors.

Some of the small repair sites in rural New Zealand indicated they would not want to become COF certifiers. However, those we spoke with acknowledged that if the area was to not be served by any COF inspector (say because the remote site inspector ceased to come) then the market would simply dictate they enter; the cost to operators would otherwise be relatively extreme. This could take the form of operators themselves making an investment to allow their repair operators to undertake COFs.

The transport industry is innovative and is responsive to change

The capacity for innovation and adaption is important when considering the ability of the market to respond to potentially major regulatory reform. It helps to inform judgement about the scale and pace of market share change. Engagement with industry representatives has shown several areas where the truck market is innovative and adapts to changing circumstances, such as:

- The Heavy Vehicle Brakes Rule\(^9\) (the ‘Brakes Rule’) that was introduced in 2006 required trucks’ brakes to be tested under load situations; in response to this the equipment industry created a range of new load simulation techniques to be able to do this that were world firsts.

- The major trend in testing equipment becoming the norm across the industry outlined above was principally in response to the Brakes Rule and the creation of the ORS\(^10\) in 2008; within a period of 5–6 years it has become cost-effective to purchase equipment for reasons that were not required earlier. It is a case of ‘create the demand, and there will be supply’.

- Like other industries, technology is steadily improving. The safety features of new trucks are becoming more sophisticated and repairers arguably require continual training overseas in order to appropriately judge whether certain aspects of modern vehicles are safe. Truck servicing equipment is improving in performance; an example is Cable Price in Wellington, which installed lifts that can raise two fully laden B-Trains (truck and two trailer units), removing the need for inspection pits.\(^11\) There is a progressive trend for electronic diagnostic testing equipment and centralised electronic databases for automated inspections of a wider range of vehicle issues (eg matching the timing of brakes in truck combinations).

This highlights the need to look at reforming the standards for vehicle inspection and for inspection sites to make them more performance-based; for instance, Cable Price’s move

away from inspection pits would be noncompliant for doing COF inspections under the current prescriptive-standards.

**There are knowledge and skill gaps in the industry**

Both inspectors and repairers and service agents have knowledge gaps to the likely detriment of safety performance and cost minimisation for business. Repairers cannot obtain training in how to inspect vehicles to COF standard. Instead, it is common for repairers to comply with original equipment manufacturers’ requirements rather than with NZ Transport Agency’s requirements.

Moreover, inspectors are not specialists in the continually evolving technologies in new vehicles. They may sometimes struggle to appropriately judge whether novel features are safe. This contention over what should pass or fail a safety check is likely to contribute to the fail rate that is high relative to the extent of pre-COFs assumed. Some repairers informed us that clients wish to limit the chance of a failed COF inspection, and so some repairs are carried out that repairers themselves regard as redundant.
3. Options and base case

There are two key dimensions of the COF reform options: market contestability, and inspection frequency. These are shown in Table 3 which summarises options put forward in the public discussion document.12

The ‘inspection frequency’ involves assigning a range of different COF frequencies to operators depending on factors (that are to be established by the NZ Transport Agency) that relate to the level of operator safety performance. The ‘market reform’ options would allow the approval of COF testing organisations that may operate vehicles and/or conduct maintenance, service and repair, and involves investment in monitoring auditing to ensure the quality of inspections.

Table 3 COF policy options as framed for CBA modelling

<table>
<thead>
<tr>
<th>COF</th>
<th>Status quo</th>
<th>Option 1</th>
<th>Option 2</th>
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<tbody>
<tr>
<td>Inspection frequency</td>
<td>Currently all are at 6 months, but provision for variable frequency 3 to 9 months not implemented.</td>
<td>Implement variable frequency of 3 to 12 months – default inspection frequency remains at 6 months</td>
<td>Implement variable frequency of 3 to 12 months – default inspection frequency becomes 12 months</td>
</tr>
<tr>
<td>COF market reform — choice in provision of inspection services</td>
<td>Currently only three providers are approved to provide COF inspection services. These providers do not undertake repairs.</td>
<td>In addition to testing stations, vehicle repairers (including operators) could be approved to offer COFs</td>
<td>Same as Option 1 plus transport operators could be accredited to manage the maintenance and compliance of vehicles with COF requirements</td>
</tr>
</tbody>
</table>

The option (and base case) scenarios used in for the CBA are as follows:

- **Business as usual (base case):** Continuation of the TSDA-only model, 6-monthly COFs on average, and prescriptive standards for facilities.

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12 We have not evaluated further the public discussion document option of providing flexibility for testing stations to issue a COF in instances where faults are minor on the proviso they would be repaired. The option has small savings as maybe 5 percent – 10 percent of vehicles could avoid a further inspection trip, and the more important issues about geographical service coverage and market power impacts discussed in this section would fail to be addressed. However, the ability for testing stations to have this flexibility might be an important feature in the future if Option 1 (opening COF inspection to vehicle repair providers) is adopted, as it would enable independent testing stations to be more competitive. It would be a small operational change that could be considered by the New Zealand Transport Agency through modification of existing terms and conditions for independent testing stations.
• **Market reform COF-B inspection:** Approved COF-B testing organisations may operate vehicles and/or conduct maintenance, service and repair, and will undergo audits to ensure the quality of inspections. Sites and facilities must meet performance (rather than prescriptive) standards that only have regard to the effectiveness of inspections (rather than issues that do not relate to the effectiveness of inspections). COFs are still required 6-monthly.

• **Inspection frequency change:** Continuation of the TSDA-only model but some of the fleet will be required to obtain a COF every 12 months rather than the current 6.

In addition to these options, an alternative COF base case with WOF option effects is modelled as a ‘what-if’ scenario. If WOF is reformed it is assumed that it might have the effect of reducing service availability of COF inspections and escalating inconvenience costs, if restrictions on who can inspect remain in place.

The following scenarios were not modelled, but conjectures on the possible benefits and costs are provided following the analysis of the above scenarios:

• The scenario of joint market reform and inspection frequency change is not explicitly modelled because of uncertainties over which operators would be granted the frequency concessions and how those operators would already be affected by the market structure aspect.

• Corresponding scenarios for COF-A are not explicitly modelled because of time constraints. However, the effects are expected to be qualitatively similar to COF-B in several respects.

We have also not evaluated the option for accreditation for transport operators. Accreditation involves operators, who meet high quality assurance standards, being treated as continuously compliant with the COF requirements. While this has merit, and is used in Australia, it requires further development prior to consideration of costs and benefits.
4. Approach and key assumptions

4.1. Projecting volumes over the 30-year appraisal period

Forecasts were made of the fleet size and the number of inspections in the base case over a 30-year appraisal period as outlined in Figure 3. These were established using 2011 data and projecting forward using the same fleet growth assumptions as the Ministry’s Vehicle Fleet Emissions Model. There are projected to be about 154,000 vehicles, 285,000 initial inspections, and 372,000 total inspections in the 2013/14 (July to June) year.

Figure 3 Baseline projections of the COF-B fleet, initial inspections and total inspections

4.2. The types of costs and benefits considered

The types of impacts anticipated from the options are as follows:

- **Charges, first-time inspection only:**
  - The opportunity cost of the resources (labour and capital) used to conduct the original COF inspection. This includes any quality assurance costs (which are expected to be larger for non-TSDA inspector organisations).

- **Compliance/inconvenience cost, first-time inspection:**
  - The opportunity cost of time and the vehicle operating costs incurred to drive to an inspection site and back (ie ‘inconvenience costs’) to undertake a first-time COF inspection.

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13 Specifically the average annual compounding growth rate is 1.37 percent for the first 8 years from 2012/13–2019/20, and then 1.06 percent in 2020/21 declining linearly to 0.57 percent in 2040/41.
• **Rechecks:**\(^{14}\)
  - **Charges:** The opportunity cost of the resources (labour and capital) used to conduct a subsequent COF inspection, following failure of the first attempt.
  - **Compliance/inconvenience cost:** The inconvenience costs to obtain a recheck, which encompass a return trip to a repairer and wait, as well as return trip to the inspection site and wait.

• **Pre-COFs / COF-equivalent checks:** (They need not be done by TSDAs; they can be done by repair/servicing agents, or by the operator itself.)
  - **Charges:** The opportunity cost of the resources (labour and capital) used to conduct a COF-equivalent inspection immediately prior to the first-attempted actual COF.
  - **Compliance/inconvenience cost:** As above.
  - **Disaggregation into ‘induced’ and ‘voluntary’:**
    - **Induced Pre-COF/COF:** Those Pre-COF checks that are caused by the requirement to obtain a COF. If there was no requirement to obtain a COF (say, because it was less frequent) then these costs are assumed to not be incurred.
    - **Voluntary pre-COF/COF-like checks:** Like an induced pre-COF, but this is a check that would have occurred regardless of any requirement to obtain a COF, because of the preference of some operators to periodically service vehicles to keep them economic and safe.
  - The distinction is made between voluntary and induced pre-COFs:
    - **a.** to document to potential reasons for the pre-COF activity, which is not all attributable to regulatory model
    - **b.** as the deadweight loss factor is assumed not to apply to voluntary expenditures, and

• **Avoidable repair costs (moral hazard + recheck risk minimisation):**
  - In general this source of benefit or cost relates to the cost of repairs that are not value-adding from a society-wide perspective. Increasing their incidence is a cost, and reducing it is a benefit.

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\(^{14}\) The inconvenience costs associated with repairs and re-inspection are included in the COF CBA. They were excluded in the WOF CBA as a simplifying assumption on the basis that any vehicle not found to be to WOF standard would always be obliged to get up to standard. It was assumed that the social benefits were at least as great as any inconvenience costs associated with seeking repairs (at least if the WOF standards were set appropriately). Although that continues to be the case with COF (to the extent that the standards are set appropriately), the choices around market structure allow many of those inconvenience costs to be reduced or avoided due to a change in market structure, which is a benefit overall.
Allowing repairers to inspect increases the risk of avoidable repairs being undertaken because inspections are a ‘credence good’ and some repairers will exploit their information and expert advantage. Whereas the WOF CBA regarded relaxing inspection volumes as reducing the opportunities for avoidable repair costs to be incurred, allowing repairers to issue COF may increase their incidence.

Against this, in the status quo pre-COFs will incur repairs that arguably are unnecessary, but are willingly done to reduce the chance of failure. To a degree people that willingly ‘over-engineer’ their vehicles to reduce the chance of failing the COF and suffering the inconvenience of separate repairs and then re-inspections, as well as incurring a black mark against them in the Operator Rating System.

- **Audit:**
  - This relates to the cost of an external audit agent to periodically inspect the adherence to inspection processes and systems, as well as the disruption cost on those being audited. It does not relate to any costs to adhere to a tougher process or system for inspections; that is captured in the ‘charges’ impact area.

- **Enforcement:**
  - This relates to any (if applicable) additional resource by the Commercial Vehicle Investigation Unit (CVIU) to enforce compliance to regulated safety standards. They were not modelled in the market reform option, but were included in the inspection frequency option.

- **Crash costs:** any change in accident risk expected to result from an initiative.
  - These were not modelled for the market reform option (except as a sensitivity).

**Reduction in deadweight loss:**

An increase in the cost of doing business will move trucking operators further away from a competitive equilibrium by contracting their short-run marginal cost schedules. This increase in costs will cause some of their consumers/clients to demand less of their services (an allocative inefficiency), and can affect the structure of markets in the long-run (a dynamic inefficiency) and the extent that businesses will innovate. We did not estimate these benefits because we did not obtain the required information within the available timeframes to do the analysis.
4.3. The model assumptions

Simplifying assumptions
A key principle of our methodology is to exclude costs that are not net-costs to society. The key instances of these are as follows:

- *The costs to undertake necessary repairs is not included in the CBA.* Owners voluntarily invest in maintenance to sustain vehicle performance and vehicles are required to be maintained to COF standards at all times whilst on the road. Any technical defects of the vehicle identified during inspections are required to have been repaired irrespectively. The inconvenience costs associated with necessary repairs are excluded too, except as far as that they can be avoided under a different regulatory structure.

- *Any preference for vehicle owners to incur greater cost than necessary (say, by having repairs/maintenance done separately from inspection) does not increase net social costs.* Where rational and informed owners prefer to have a TSDA undertake a COF inspection, then society as a whole is not worse off for it, and the additional costs (compliance costs and duplications of checks) are ignored.

- Sophisticated statistical analysis of crash cost risk was not able to be undertaken because of the small number of truck crashes. However, the COF options are designed so they do not increase crash cost risk materially. Thus, any change that might escalate risk (such as removing the ‘independence’ requirement or relaxing the inspection frequency for some operators) is assumed to be offset by increased auditing and/or by only allowing any concessions to entities that do not pose an elevated safety risk.

The relative importance of the safety assumption is tested through scenario analysis in Section 5.4 below.

Key assumptions — future market shares and degree of duplication
There is significant uncertainty in the CBA estimates, because they involve assessing scenarios of non-marginal changes to market structure and changes in transport operator behaviour. The key assumptions that most affect the CBA results are:

- *Testing station market share:* Those truck operators that prefer to have an inspection carried out by an independent organisation will gain no benefit from the reform option. The question is - how many operators who currently must go to TSDAs would continue to go if given the choice of being able to go to a repairer? Indications from industry are that there will be a demand for COFs to be performed by independent testing stations. It is assumed that the market share of such services would be between 10 percent and 20 percent in the long-term, with a mid-point estimate of 15 percent.
• **Duplication**: The proportion of COFs that currently have pre-COFs undertaken: in future pre-COF inspections would become formal COF inspections if they are undertaken by approved inspectors. Savings depend on assumptions of how many pre-COF inspections (that are of the same standard as a COF inspection) presently precede actual COF inspections and the low to high range is assumed to be 40 percent to 80 percent, as discussed further below.

**Duplication Estimates**

Three scenarios are considered, whereby the total share of COFs that have had a COF-equivalent inspection conducted beforehand, are 40 percent, 60 percent and 80 percent. The numbers are an order of magnitude larger than the number of pre-COFs that TSDAs have told us they do, but we attribute that to the capacity constraints at the limited number of TSDAs, and to the distances that must be travelled to get to a station. The offsite model that services outlying areas does not apply to pre-COFs.

Moreover, it is not likely that vehicles would be presented for a COF without at least some degree of pre-check, if even only to do a visual walk-around check. The inconvenience costs associated with failure are high, as outlined above. If data permitted, we would ideally have estimated a spectrum of pre-COF efforts, indexed against a COF-equivalent inspection. Instead, we make only a broad estimate of the aggregate amount of work done to inspect vehicles prior to a COF, and express this value as a share of vehicles that had COF-equivalent inspections prior to the actual COF. The assumption holds over the 30-year appraisal period, and we expect a continuation of the recent trend for roller brake machines and load simulation devices to be installed throughout the industry. We assume that half of the pre-COFs would have occurred regardless of whether a COF was needed, and half were induced by the need to have a COF in order to minimise the chance of failure.

The wide variation of 40 percent – 80 percent reflects the high degree of uncertainty we have, in the absence of richer empirical data. While we were advised by repairers of their policies for all trucks to leave their premises at COF standard and that many, if not most, customers got pre-COF checks, the higher end of the estimates does not appear to align with TSDA COF fail rates of around 30 percent. There are, however, explanations for this discrepancy:

- **Market self selection** – there are likely to be segments of the market where transport operators do not face significant downtime costs or are not incentivised by the ORS to pass COF a first time, and choose to use the COF test to ascertain what repairs need to undertaken (they may also do a rough order pre-COF to spot any obvious issues). This segment is not likely to be a frequent client of repairers and will have very high fail rates.

- **Information asymmetries** – as reported in our research findings, repairers and TSDAs have all spoken of significant knowledge gaps between the repair and testing providers, on what is required for a COF. One group is trained to follow NZ Transport Agency’s testing manuals and other to meet the manufacturers’ specifications.

- **Indicative nature of pre-COF tests** – as evidenced by one national repairer web-site the pre-tests are “indicative” so, while they are in most respects like a COF test they are unlikely to be as rigorous, in part due to the knowledge asymmetry.
• **Complexity** – the complexity of heavy vehicles and variations between test equipment can mean different judgements can affect pass fail outcomes. Inspectors and repairers are dealing with continuously changing vehicle technologies and prescriptive regulation may not always keep pace.

While not the focus of this report, discrepancies between the knowledge of repairers and testing stations are of concern. They are suggestive of not only inefficiency, but also indicate that there is significant room to further improve vehicle safety if repairers were more skilled and knowledgeable of the regulated inspection requirements. Thus, there may be potentially broader gains from having integrated inspector-repairers, but these cannot be quantified in the CBA.

**Testing market share**

As the CBA involves a change in market structure, we need to anticipate potential market shares for repairers and testing stations in the future. As noted above, the question is - how many transport operators that currently must go to TSDAs would continue to go in future if given the choice of being able to go to a repairer? In other words, what is the profile of ‘captive’ vs ‘choice’ customers for TSDAs? These market share estimates are very important assumptions - if all of the market is captive, then the benefits are at their maximum; if half are choice customers, then the benefits are halved and so forth.

The only information we have to answer the market share question comes from limited market surveys\(^{15}\) of operators, discussions with market participants and the actual market share outcome of the more liberal warrant of fitness (WOF) market where repair service providers can offer WOF inspection.

Market survey information (National Road Couriers) tells us that around half of transport operators believe "independence" of inspection is very important or important. However, there is no reason to believe this would influence future inspection purchase choices. Indeed only around 14 percent of operators reported that they believe that independence means inspection provision should be limited to TSDAs. Around half believe it should be limited to TSDAs and vehicle repair service providers. A further 32 percent believed transport operators should be able to undertake inspection or at least there should be no limits put on who can provide the service. So, despite "independence" being valued, operators do not appear to believe independence can only be delivered by the TSDA model.

Operator views on independence and market structure above are suggestive that the vast majority of operators would consider alternatives to TSDA inspection. While off a small base, the NZIER survey indicates 85 percent of operators confirmed they would switch provider when given the hypothetical choice of being able to use people who service or repair their vehicle to also inspect them. These responses are consistent with views expressed by operators, TSDAs and repairers in interviews.

In the WOF market, 80 percent of people use repair service providers and only 20 percent use TSDAs. While applying this market share ratio to COF implies a substantial market transformation, there is good reason to believe the shift might be even more dramatic:

\(^{15}\) National Road Couriers Survey 2010 and NZIER 2012.
as indicated by the survey data, operators are open to considering other inspection providers, and are motivated by substantial inconvenience costs used in this CBA

moreover, many operators see the trip to the TSDA as lost productivity (around 25 percent), reflecting the stronger commercial drivers compared to most of the WOF market

as noted earlier in the report, there is already an active pre-COF market, ready for conversion into a full COF with investment in training and equipment

service repairers have advised us that as soon as a competitor offered a COF inspection service everyone in the market would follow.

We therefore conclude that TSDA’s currently have very few ‘choice’ customers, and most are captive due to regulatory regime. Subject to the training and approval of new entrants, the evidence suggests the market shift could occur over a 4 – 6 year period.

4.4. The approach to quantifying impacts in the base case

Appendix 1 sets out the cost estimates included in the base case and adjusted in the option analysis. That section is relatively detailed with the intent of allowing third parties to be able to broadly reconstruct a similar CBA.

4.5. The approach to quantifying costs and benefits for the market structure option

The following sections outline how the annual net benefits of the market structure option are estimated. It is assumed that there are no changes to the number of vehicles, inspections, and rechecks in each year (as outlined in section 4.1).

Projecting the speed of market transition for the market structure option

The option scenario involves the introduction into the market of non-TSDAs (henceforth ‘repairers’ for simplicity) undertaking COFs that can operate, repair, maintain and service vehicles.

It is assumed that it would take a number of years of transition towards a long-run equilibrium of market share. It takes time to develop full complements of trained and experienced staff, equipment and sites, and internal business systems to deliver the service to a sufficient quality. It also takes time for markets to evolve and for customers to change their expectations and desires of suppliers.

How the market will transition is uncertain; it could change slowly, or it may take off with many suppliers following early movers. There is a key constraint, however, in the pace of change, and that is the number of qualified and skilled inspectors. As at 30 July 2012 diesel motor mechanics (including heavy vehicle inspectors) are on Immigration New Zealand’s Long Term Skill Shortage List. The provision of training and qualification courses could be a factor that helps determine the pace of change.
It is assumed that it will take 4–6 years of transition before the long-run market share of repairers of 80 percent–90 percent occurs. In the mid-point scenario it is assumed it takes 5 years of transition before a market share of 85 percent occurs in year 6. The transition is assumed to occur linearly, for simplicity.\textsuperscript{16}

**The expected cost of each initial inspection in the market structure option**

The cost of inspections for TSDAs is assumed to be unchanged regardless of their market share.

However, it is assumed that repairers will be expected to have additional requirements on their inspection processes, such as requiring internal independent quality assurance steps to be followed. For instance, it could perhaps be required that the certified inspector that ultimately signs off on the inspection either had no part to play in the repairs/maintenance of the vehicle, or if they did, that another suitably qualified inspector double-checked the former inspector’s work. This would increase the cost of inspections for repairers relative to TSDAs.

It is assumed that repairers have 10 percent–30 percent (mid-point 20 percent) higher inspection costs in the short-term and 10 percent–0 percent (mid-point 5 percent) higher costs than TSDAs in the long-term, and that it takes 10 years of linear transition. The reason for the decline is that the repair industry is expected to innovate and become more productive, by for example developing more automation to aspects of their inspections; this will reduce the level of labour and double checking needed to provide internal independent quality assurance.

**Initial inspection costs in the market structure option**

It is assumed that in the long-term (from year 6 onwards) ‘captive’ customers that would otherwise be doing a COF-equivalent safety check as a part of their scheduled vehicle maintenance would be awarded a COF with little extra effort. This entirely saves the cost to have a separate COF inspection done elsewhere.

**Initial inconvenience costs in the market structure option**

Like above, from year 6 onwards the inconvenience costs to obtain a COF from a TSDA can be wholly avoided by those ‘captive’ customers that would have done a COF-equivalent check then anyway. This saving in duplication ramps up linearly over 5 years of transition.

**Recheck costs and inconvenience costs in the market structure option**

From year 6, there are no inspection costs or inconvenience relating to rechecks; they are entirely avoided. It is assumed that ‘captured’ customers would be having inspections done by repairers that address faults at the time of inspection. Any time spent and expenses incurred during the repair is ignored, as outlined in section 4.3 above, including any delays in repairs (such as the need to order parts).

The recheck costs and inconvenience costs are assumed to decrease linearly over years 1 to 5.

\textsuperscript{16} The year 1 market share of repairers is about 14 percent, and grows at increments of about 14 percent until a market share of 85 percent is hit in year 6.
Induced pre-COF costs and inconvenience costs in the market structure option

Some of these pre-COFs are induced by the COF, and some would happen anyway because vehicles are highly trafficked; for simplicity we assume the two types are split 50:50.

Like rechecks, it is assumed that ‘captive’ customers would wholly avoid the need to duplicate induced pre-COFs (those that only occur because of the need to have a COF).

These types of customers would have sought pre-COFs in the base case in order to reduce the chance of failure and thus the inconveniences associated with repairs and rechecks and/or getting black marks in the Operator Rating System. If it is repairers that are doing the inspection then there are no additional inconvenience costs of a sort we are including in this CBA. Moreover it is assumed that any inspection that was initially failed then repaired, and may go down on the record as a first-time pass. Although this may not be desired practice from certain perspectives of the regulator, the market would likely dictate that this would be practice in the context of the ORS incentives. If an inspector was a stickler for proper process then they would likely lose these types of customers (‘captive’ customers that would do induced pre-COFs). From an economic efficiency perspective this poses no discernable problems.

The savings in avoided induced pre-COF costs ramps up linearly from 17 percent in year 1 to 100 percent in year 6.

Avoidable repair costs in the market structure option

There are two components to avoidable repair costs in the market structure option:

1. excess repairs undertaken in advance of a COF to reduce the chance of failure,\(^\text{17}\) and

2. excess repairs required by a third-party COF inspector that does repairs.\(^\text{18}\)

The first component is estimated in the same way as it is for the base case, except that it is scaled down by to the market share that TSDAs have in each period (14 percent in year 1 declining to 85 percent in year 6). The second component is equal to the number of rechecks required by repairers times 5 percent of the assumed average repair bill of $1000. In year 1 this amounts to about $3 million and it increases to $5.2 million in year 6, which is the first year of the long-run steady state.

Audit costs in the market structure option

There are two components to audit costs in the market structure option: those accruing to TSDAs and those to repairers. The costs to TSDAs are formulated in the same way as for the base case, except that they are proportioned downwards in line with their declining market share.

The annual average audit cost for a repair site is assumed to be greater than that for a TSDA. The cost of a given audit is assumed to be slightly higher at about $1,400,\(^\text{19}\) including three

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\(^\text{17}\) This is a problem of asymmetric information, whereby operators (as well as their repair agents if they have them) do not know in advance what the inspector may fail them on.

\(^\text{18}\) ie by a repairer that is not an operator.
hours of the inspection site's staff time consumed at $85 per hour. Unlike TSDAs, who have audits about every 22 months on average, repairers are assumed to be more closely monitored and to have audits annually. They are assumed to have 50 percent more random truck reinspections by auditors than TSDAs, at a cost of $1,500. This sums to about $3,000 annually per certified repair site.

It is assumed there will be between 150 and 250 repairer sites in the long-run (mid-point 200), where the long-run is set to commence after 4–6 years of linear transition.

The audit costs in the market structure option are estimated to be $201,000 in year 1,\(^19\) and $615,000 in the first year of the long-run steady state (year 6).\(^{21}\)

**Enforcement in the market structure option**

It is assumed that there would be no change in the amount of Police roadside enforcement resource under this scenario relative to the COF base case.\(^{22}\)

### 4.6. The approach to quantifying costs and benefits for the inspection frequency option

A possible element of COF reform is to allow variable frequencies for inspections. There would be benefits from permitting some operators to obtain COFs less frequently if the market structure was left unchanged, because the exposure to the multiple layers of duplicated costs outlined above is reduced.

An illustrative approach was taken to estimate the benefits of implementing a variable inspection frequency regime (whilst retaining the current independent market structure regulation). The frequency option was not modelled with the market structure option in tandem because the impacts would depend on which operators were awarded the frequency concession and why, and it was unclear how this might be implemented.

It was assumed that some proportion of the fleet would be allowed to move to inspection frequencies between 6–12 months, and that only those operators that did not pose an undue elevated safety risk would be granted the concession. However, like the WOF reform analysis of reduced inspection frequencies, increased enforcement costs. Police enforcement costs were assumed to increase.\(^{23}\)

For simplicity, a scenario was tested where 25 percent of the COF fleet are required to have COFs 12-monthly and the remainder stay at 6-monthly. The scenario is estimated using the same assumptions as the base case except that the number of initial inspections is scaled

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\(^{19}\) Instead of assuming the NZTA cost is $909.20 times 120 percent, like the base case, we rounded up to $1000 times 120 percent.

\(^{20}\) Roughly, this is about 58 TSDA sites times $1,760 plus about 34 repair/inspection sites times about $3000.

\(^{21}\) This is about 8 TSDA sites (15 percent market share by value) at $1,760 plus 200 repair sites at $3000.

\(^{22}\) That is not to say there may be difference in CVIU effort attributable to WOF reforms, but that is assumed to be held constant with respect to the COF options appraised here.

\(^{23}\) By 6.25 percent (a 25 percent increase in the overall CVIU budget multiplied by 25 percent of the fleet that are granted the frequency concession).
down accordingly. The costs for initial inspections, rechecks, pre-COFs and avoidable repair costs is scaled down accordingly too.

4.7. The approach to quantifying impacts in an alternative base case (with WOF reforms)

It was suggested in the Regulatory Impact Statement on the WOF reform options that the WOF and COF markets are inter-related, because stand-alone testing stations (VTNZ, VINZ, and the AA) provide both of these services. Reforming WOF, and not COF, could cause unintended consequences and thus they should be considered as a package.

The net present values (NPVs) reported for WOF were based on no detrimental effect on transport operators arising from changed COF inspection service levels and prices. The WOF reform options may adversely affect the existing COF inspection market by reducing the number of sites and reducing geographic coverage for vehicle operators, as testing stations seek to off-set lost WOF revenue. This would be an additional detriment attributable to the WOF options in the unlikely case that COF was not reformed at the same time. If the COF market was also reformed, however, to allow repairers to undertake inspections, then the social costs estimated here would be avoided.

As an illustration, the inconvenience costs for initial inspections (i.e. travel time, distance, and queue times) only (ie not rechecks or pre-COFs) were doubled. It was also assumed that in that case operators and repairers would increase their unnecessary repair costs by 50 percent to further try to reduce the chance of failing a COF and incurring the associated higher inconvenience costs. The results of this exercise are reported in the next chapter.
5. CBA Results

5.1. COF-B market reform

Comparison of annual costs in year 6 (the first year of the steady state)

Figure 4 compares the estimated costs in year 6 (the 2018/19 July to June year) and shows an annual net benefit of some $29 million. This reduction comes about from the avoidance of recheck inconvenience costs and charges; the avoidance of induced pre-COFs; the conversion of voluntary pre-COFs into COFs, which thus reduces first-time inspection costs and charges. Factors that offset the extent of benefits were slightly higher audit costs, avoidable repair costs, and inspection charges by repairers undertaking COFs.

Figure 4 Comparison of costs in the base case and market reform scenario in year 6

NPV results

Figure 5 shows that the NPV estimates for the COF-B market reform option range between $160 million and $460 million net present value, with a mid-point estimate of $300 million. The annualised savings based on an annuity-equivalent approach are $14 million, $26 million and $41 million for the low, mid-point and high respectively.

The results are driven by removing multiple layers of costs to truck operators. The savings in inconvenience costs and charges for initial inspections largely come about because half of the pre-COFs that would happen anyway simply become COFs. The remaining pre-COFs induced would not need to be incurred anymore. Any safety problems identified are assumed to be addressed at the time of the COF, rather than being dragged out over time.

The two key assumptions of long-term TSDA market share and the extent of COF duplication (outlined in section 4.3) contribute to over 75 percent of the variability of the results.
Benefits not included

There are potential sources of benefit excluded in the appraisal. There will be broader business disruption costs from vehicles failing an independent COF inspection, because the vehicles must then be off the road until repaired and successfully rechecked. This can impose unplanned disruption, and some operators are going to considerable cost to reduce the chance of failure, by duplicating inspection infrastructure. Having integrated inspector/repairers that can address faults at the time can reduce these broader disruption costs. Another benefit not captured relates to lower end-prices to consumers and corresponding increased industry output.24

5.2. Cost-benefit analysis — COF-B inspection frequency options

A possible element of COF reform is to allow variable frequencies for inspections. There would be benefits from permitting some operators to obtain COFs less frequently if the market structure was left unchanged, because the exposure to the multiple layers of duplicated costs outlined above is reduced.

Assuming only independent testing stations are allowed to continue to inspect (ie the current market structure), the net present value of allowing, for example, 25 percent of trucks subject to COF-B to undertake annual inspections (whilst the rest stay at 6 months) is between about

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24 More specifically, we did not account for demand elasticities and increased output arising from lower prices.
$46 million to $67 million, with a mid-point estimate of about $55 million (annualised\textsuperscript{25} value of $4 million to $6 million, with mid-point $5 million).

If the market contestability option was also undertaken, the scope for benefits from frequency changes is substantially lower than $55 million, and depends on which operators are being awarded the frequency concession and why.

5.3. Cost-benefit analysis — COF-A

The market for COF-A is one tenth that of COF-B by value ($3.5 million versus $35 million annual revenues), and about one-third by volume (55,000 vehicles versus 150,000 for COF-B). Similar reform options can apply to COF-A as for COF-B, but a CBA has not been undertaken for COF-A. If the WOF and COF-B changes are undertaken then the market contestability reform option will most likely be necessary for COF-A, because there may be a significant reduction in the number of independent testing stations. Moreover, COF-A operators would receive similar kinds of benefits as COF-B operators, such as reducing the inconvenience costs when vehicles fail and require repair and then recheck(s).

5.4. Risks and sensitivity of results

The sensitivity of results to the key assumptions concerning future market shares and the degree of duplication has been discussed above. Together they account for 75 percent of the variation in the CBA results. Below we consider the robustness of safety assumptions and transition risks that need to be managed in order for economic benefits to be realised.

Safety assumptions

No increased crash costs are estimated for the market reform option as it is assumed that monitoring and auditing of inspectors ensures that inspection quality is maintained and hence no safety issues arise.

Vehicle defects make a larger contribution to heavy vehicle crashes than they do for light vehicles. Over the last 10 years this contribution has varied from between 4 percent - 7 percent. However it is important consider this in absolute numbers which are very small – for the three years to 2011 there were only 18 crashes on average per year. The total annual average social cost over the last 5 years of $13 million is equal to half of the annualised savings of the midpoint estimate for the market reform option. It would take some rather heroic assumptions and logic to suggest a change in who provides inspection could have such a detrimental effect as to double the crash rate and thereby negate the benefits of opening the market.

Another way of testing the robustness of the inspection model safety assumption is to assume a reduction in inspection quality translates into a proportionate increase in crash costs. If quality deteriorated by say 15 percent\textsuperscript{26} and this was proportionally reflected in the

\textsuperscript{25} These annual estimates are calculated using annuities; ie the sum over 30 years of the uniform benefit discounted at 8 percent equals the respective NPV. The NPVs are rounded to the nearest multiple of $5 million, given the estimates are illustrative.

\textsuperscript{26} To illustrate this reduced quality could be reflected in mistakenly false COF passes.
social cost of crashes, it would reduce the midpoint NPV by 7 percent. This would not materially impact the CBA results.

We note that an adverse safety outcome is highly unlikely from changing inspection models, provided monitoring, auditing and enforcement are implemented. Indeed, it can be argued that there would be an improvement in safety arising from integrated repairers/inspector organisations. Bringing these parties together would close the current knowledge gap for repairers around what is required to meet COF quality standards, and mean that regular vehicle servicing would identify more safety related COF issues.

In respect of the frequency option, it is important to note that assuming the implementation (still in the early design phase) is successful, and only operators with a proven safety record get an extended frequency, then crash risks are avoided.

**Transition risks**

It is clear from market research findings reported in Section 3 of this report that are substantial implementation issues to be addressed if reform benefits to be gained. The CBA analysis assumes implementation of change addresses the following issues:

- access to training for COF inspectors working for repair organisations
- application of robust audit and monitoring for all organisations approved to be inspection providers
- introduction of greater flexibility around prescriptive site specifications

The last point on prescriptive site specifications refers only to requirements that go beyond achieving robust inspections. Prescriptive specifications cover an enormous range of things including drive way and door size requirements. Not only can such prescriptive requirements limit entry into the market, but it will also have a detrimental effect on innovation over time.

**Costs to heavy vehicle operators of reforming WOF but not COF**

A further risk to the CBA estimates for COF and WOF (see Interim CBA WOF) arises from independencies with the proposed WOF reforms. There is a risk that TSDAs could try and recover revenue lost from a reduction in WOF inspection frequency through service levels decreases or prices increases for COF.

As an illustration, if the travel time, distance, and queue times all doubled then annually costs to industry would increase from $20 million to $25 million in the first few years. This would be equivalent to around a 50 percent price increase, or about $65 per inspection, assuming station coverage remained the same. In practice, any detrimental effects would be a combination of services changes and price increases and it is not possible to estimate these with any precision.
6. Appendix 1 — base case assumptions

The costs for initial inspections in the base case

The average cost for initial COF-B inspections is assumed to be $126 (excl GST) over the appraisal period. This was sourced from Technical Advisory Group members, who are industry experts. This represents the cost of the resources to undertake inspections, and it includes the NZTA administration fee of $2.40.

From the outset there is a question of whether the prices supplied by a 3-player market would reflect underlying resource costs given the potential for market power. VTNZ, who have 86 percent market share for COF, kindly provided a rich level of disaggregation for the actual costs they charge by site. There was no clear indication that prices were markedly higher where existing competition was absent. Prices are some 20 percent higher in about nine more remote areas compared to other sites with comparable inspection volumes. However in many (but not all) instances this could be attributed to VTNZ cross-subsidising its services to ‘offsites’ (ie places where there are no stations); this would be an exercise of market power, but not necessarily an inappropriate one. We understand AA’s and VINZ’s prices are marginally lower than VTNZ’s. In our discussions with repair industry stakeholders we sounded out what it might cost for them to provide COFs; their rough-order cost estimates were in the same ballpark as VTNZ’s costs. On that basis we use VTNZ’s average prices as reflecting actual resource costs, but they might be slightly on the high side.

The total charges for initial inspections are estimated to be $36 million in year 1 (the 2013/14 fiscal year).

Estimates of the inconvenience time for initial inspections in the base case

Vehicles need to travel to and from an inspection site, wait for the inspection to commence, and then wait during the inspection. This is time that could be used for productive purposes. The average time for a first-time inspection was assumed to be 1.45 hours (87 minutes). This was established as follows.

A triangle probability distribution was assumed, whereby we specified the minimum, maximum and most likely values. The mean value would exceed the most likely value if the distribution was asymmetric and skewed upwards.

The ‘most likely’ value for the probability distribution was 1.30 hours (78 minutes). The TERNZ COF-B report27 says average waiting time of 12 minutes (p49), average inspection time 36 minutes (p49) using VTNZ data, and 30 minutes travel for return trip (p52). The minimum value was 1.15 hrs (69 minutes) if average travel time is less at 21 minutes.

The maximum value assumed was 2 hours (which excludes one-off extreme long waits that literally exceed 2 hours). The TERNZ report could not account for major discrepancies between VTNZ’s estimated wait and inspection time and Truckstops’ data. Truckstops data indicates waiting time of 33 minutes, inspection time of 44 minutes, and total time (including travel time) of 94 minutes. Moreover there are indications from industry that underlying wait

times are often substantial. A National Road Carriers in 2010 found about 20 percent waited over two hours; and 9 of 13 respondents to NZIER’s survey waited 2+ hours. Discussions with industry indicate wait times can be more substantial than is measured at the queue for various reasons. Some drive past sites with queues and try the next station Also some operators are incurring 6-figure costs to install equipment to pre-test trucks in order to avoid the inconvenience costs of queuing in order to have pre-COFs done; moreover some TSDAs do not allow pre-COFs if queues are too long (such as Rotorua). These outcomes all represent costs relating to bottlenecks that should be accounted for also.

Estimates of the value of inconvenience costs for first-time inspections in the base case

The value of time was estimated to be $34.31 per hour. This was established as follows:

- $26.73 per hour for the driver’s time using the value in the NZTA’s Economic Evaluation Manual (EEM)
- The EEM has a value of $22.74 per hour for the value of travel time savings for the vehicle and freight. This was scaled down by two-thirds (to become $7.58) because 33 percent of respondents to the National Road Carriers’ 2010 survey indicated that they can't choose the time have productivity loss; the remainder will schedule the time away from when it would have been used.

The 1.45 hours is thus valued at $49.91. We note these values are low compared to the rate at which staff and vehicles are charged out at in this competitive industry (some $60–$80 per hour).

An average travel distance of 11.7 km (return) was assumed. This was estimated on 17 percent of COF-B inspections are undertaken at either the nine remote VTNZ sites or at offsites, and they are assumed to travel 20km (10km each way). The remainder are assumed to travel 10km (5km each way). An average cost of $1.05 per km is assumed from the EEM, which corresponds to a vehicle operating cost of $12.31.

This brings the total COF-B inconvenience cost for first-time inspections to $62.22, and total first-time inspection inconvenience costs for the industry as a whole to $18 million in year 1.

Costs and charges for re-checks in the base case

The charges for COF rechecks are minimal, and are often subject to the number of faults the vehicle had been failed for.28 It is assumed that one-third of rechecks are subject to a material level of resources (and are hence charged for), and those one-third cost $19 (as advised by TAG members).

The value of the cost of rechecks is scaled down to reflect the percentage of operators that are ‘choice TSDA’ customers. That is because they would willingly incur the cost of separate rechecks at a later time because the benefit to them is at least as great. As such this apparent gross cost is not a net social cost.

28 COF rechecks can be charged for, unlike WOF.
With about 87,000 rechecks in year 1, the estimate for recheck charges that year is about $463,000.\(^{29}\)

The estimates of inconvenience costs for rechecks are larger by more than an order of magnitude. Operators will need to do at least one (if not more) return journey(s) to a repairer, and then return journey(s) to the inspector again. The time estimates and valuation of time differ from first inspections.

The recheck time is assumed to be 0.88 hours (53 minutes). It is assumed there is 6 minutes for the recheck itself (prorated from the average time of a first-time inspection); 16 minute wait time (which is half the first-time inspection wait time of 33 minutes) because TSDAs often (but not always) let rechecks jump the queue; and the same travel time for the 11.7km round trip.

The value of time is valued for rechecks at $49.48 per hour to reflect a 100 percent weighting of freight and vehicle time from the EEM’s standard values. This is not because trucks are assumed to be rechecked loaded with freight, but because if the separate recheck could have been avoided (as it likely would in the market structure option), then this time would be used for normal productive use. The inconvenience cost of the recheck is $43.72 plus the vehicle operating costs of $12.31, summing to $56.03.

Taking the vehicle for a repair is assumed to take 0.66 hours (40 minutes). This is based on a travel time and wait component, but not the time for the repair itself. The repair time is not included for the same reason as the repair cost is excluded: it should be done anyway, and the benefits are at least as great as the cost. The time and wait components are counted because they are avoidable in the market structure option. The travel time and vehicle operating costs are assumed to be 75 percent of that to an inspection site because they should be more numerous and thus closer, and the wait component is half of the time assumed for first-time COF inspections (as is assume for rechecks). Including vehicle operating costs this sums to $38.48.

The total inconvenience cost of rechecks in the base case for year 1 is about $7 million.\(^{30}\)

**Costs and charges for pre-COFs in the base case**

Engagement with industry stakeholders indicates that operators commonly have vehicles inspected prior to being presented for a formal COF check. These inspections are progressively being done to a COF standard, and not just by specialist repair sites but by operators themselves. Many repairers and operators are sinking capital into inspection pits, roller brake testing machines, and load simulation devices (all of which are the principle costly items strictly necessary\(^{31}\) to do a COF-equivalent inspection).

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\(^{29}\) This is roughly 87,000 rechecks times 33 percent of rechecks that incur material recheck efforts times $19 cost of those efforts times 85 percent market share that is ‘captured’ (rather than ‘choice’).

\(^{30}\) This is roughly 87,000 rechecks times the sum of $38.48 and $56.03, but scaled back by 15 percent to account for choice customers.

\(^{31}\) ie as distinct from what the NZTA necessitates being in place that do not relate to the effectiveness of a COF inspection, such as the size of the inspection site.
Some of these pre-COFs are induced by the COF, and some would happen anyway because vehicles are highly trafficked; for simplicity we assume the two types are split 50:50.

The total cost for the inspection component (ie excluding inconvenience costs) of these pre-COFs is $18 million in year 1 for the middle scenario, based on 60 percent of the 154,000 initial inspections incurring $126 per check. This includes the scale-back factor to account for 15 percent choice TSDA customers.

The inconvenience costs for pre-COFs is included in the analysis because they are something that in the market-structure scenario can either be avoided (if they were induced pre-COFs) or can be combined with those of the COF inspection itself (if the pre-COFs were voluntary).

The time estimate for pre-COFs is 1.15 hours, based on the ‘minimum’ estimate for the first-time inspection. The vehicle operating costs and travel time are assumed to be 75 percent of that for TSDA COF checks. The problem of bottlenecks that lifted the average time for first-time COFs should not exist (or at least not be sustained) in this market because it is open and competitive. Also wait and travel times should be lower too because there will be more choice for customers and thus better service. Like inspections, these checks are valued at $34.31 per hour on the basis that to a large extent pre-COFs can be scheduled to minimise forgone output. The inconvenience cost per pre-COF is $39.46 for the time plus $9.23 for vehicle operating costs, which sums to $48.69.

The total estimated inconvenience cost is about $7 million in year 1. This is split equally between induced and voluntary pre-COFs.

Avoidable repair costs in the base case

The earlier WOF CBA estimated that 10 percent of repair costs required by non-TSDA inspectors to pass a WOF were wasteful. It is assumed that the propensity for avoidable repairs to be made for heavy vehicles is half of this (5 percent) because heavy vehicle operators are likely to be less susceptible to exploitation than common car owners.

Avoidable repair costs are assumed to occur in the base case because people wish to limit the chance of a failed COF inspection. Only some portion of pre-COF vehicles will undergo repairs; what that portion is unclear, and in the absence of better information it is assumed to equal to the COF fail rate of 32 percent. The average repair bill is assumed to be $1000, of which 5 percent is avoidable in the sense that it would not be required by the COF inspector. The total avoidable repair costs in the base case in year 1 is estimated to be $2.7 million, and it is about $3 million in year 6.

Deadweight loss of regulation in the base case

The value of reduced (respectively, increased) deadweight loss of taxation/regulation would apply only to the extent to which an industry moves closer towards (respectively, away from)

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32 This is roughly 285,000 initial inspections times 60 percent share have pre-COFs times $48.69, scaled back by 15 percent to account for choice customers.

33 This is roughly 285,000 initial inspections times 60 percent share have pre-COFs times 32 percent have repairs of which 5 percent of $1000 times are unnecessary costs.
a competitive equilibrium, which is where perceived prices equal short-run marginal social cost (including externalities). For the appraisal of the market structure option the concept would only apply to the removal of costs that are not necessary for addressing the social externality of crash cost risk. This type of benefit is not quantified in the analysis because an estimate of the relevant demand elasticity is unavailable.

Audit costs in the base case

At present there are 70 TSDA station sites that are audited by the NZTA. The NZTA passes on the costs of audit to each station. At present the charges are $909.20, but these were set several years ago and the underlying resource cost in today’s terms could be some 20 percent–30 percent greater. The figure required for these purposes should represent long-run marginal social costs, accounting for fixed costs (such as vehicles travelling between sites) as well as variable costs (such as labour). It is assumed that each audit will consume 3 hours of each of the TSDA site’s staff time (both inspectors and management) at a value of $85 per hour. This all sums to $1,392.

TSDAs are audited about every 22 months on average, which is an annual average of $759.

On top of this are random vehicle inspections, whereby trucks partway through inspections are rechecked by NZTA auditors. These are currently charged at $100 per hour, but assuming their resource cost is $25 more and that there are 8 hours annually on average TSDAs incur this, the cost is $1000. Thus the total annual audit cost per TSDA is assumed to be about $1,760, and with 70 sites this sums to $123,000 in year 1.

Enforcement in the base case

In the base case it is assumed the Commercial Vehicle Investigation Unit (CVIU) will continue its normal operations.

Summary of base case assumptions

The following table summarises the assumptions made for the base case.

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34 This would have the purpose of reflecting the total costs of major changes to the audit programme, say if the number of inspected sites doubled or trebled in the longer run following reform.
<table>
<thead>
<tr>
<th>Assumption</th>
<th>Value</th>
<th>Explanation and source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volumes of inspections</td>
<td>285,000 initial inspections in yr 1; 370,000 in yr 30. 30% are rechecked</td>
<td>NZTA data for 2011/12, and forecasts based on assumptions in MoT’s Fleet Emissions Model</td>
</tr>
<tr>
<td>Captured/choice customers</td>
<td>% of customers that would willingly choose independent COFs by TSDAs</td>
<td>10%–20% Mid-point 15% Scenario-based assumption, with relatively high degree of uncertainty. 15% of respondents to an NZIER survey said that if given the choice of who inspected their own vehicle they prefer that vehicle inspectors are independent of repair services</td>
</tr>
<tr>
<td>Initial inspections in base case</td>
<td>$$\text{Average cost for COF-B (initial inspection)}$$</td>
<td>$126 Industry experts (Source: TAG members)</td>
</tr>
<tr>
<td>Time displaced for initial COF-B inspection</td>
<td>1.45 hours Mean value of a range of assumed values. Triangle distribution assumed with low, most likely and high values respectively 1.15 hours, 1.30 hours and 2 hours. Based on TERNZ report, COF surveys, and engagement with operators and repair industry stakeholders</td>
<td></td>
</tr>
<tr>
<td>Value of time for first-time inspections</td>
<td>$34.31 per hour Based on EEM values of $26.73 per hour for labour, and 1/3 of $22.74 = $7.58 per hour for vehicle and freight. (Two thirds of operators can schedule around inspections according to National Road Carrier 2010 COF survey)</td>
<td></td>
</tr>
<tr>
<td>Vehicle operating costs for first-time inspections</td>
<td>$12.31 Assume 11.7 km round trip on average to a TSDA site, assuming 17% inspections are “remote” (NZTA data and VTNZ pricing classifications) and travel 20km (10km each way) and remainder travel 10km (5km each way). EEM has $1.05 per km</td>
<td></td>
</tr>
<tr>
<td>Total inconvenience cost for initial inspections</td>
<td>$62.22 1.45 hours * $34.31 per hour plus $12.31. (Figures may not add up precisely due to rounding)</td>
<td></td>
</tr>
<tr>
<td>Rechecks in base case</td>
<td>$$\text{Average cost for COF-B recheck}$$</td>
<td>$6.33 One third of $19 (Source: TAG members)</td>
</tr>
<tr>
<td>Time displaced for COF-B (repair and recheck)</td>
<td>1.54 hours Repairs 0.66 hours, with shorter drive and wait times for repair. (Repair wait times ignored) Rechecks 0.88 hours, with same drive time, half the wait time, and recheck time minimal</td>
<td></td>
</tr>
<tr>
<td>Value of time for rechecks and repairs</td>
<td>$49.48 per hour Valued at full productive use, not because vehicles are laden with freight during repairs and rechecks, but because this time is avoidable in the market structure option and hence the opportunity cost for vehicles is normal operating use</td>
<td></td>
</tr>
<tr>
<td>Assumption</td>
<td>Value</td>
<td>Explanation and source</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>--------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Vehicle operating costs for rechecks and repairs</td>
<td>$21.54</td>
<td>Sum of $12.31 for the recheck, and $9.23 for the repair. (Repairers assumed to be only 75% the distance because they are more numerous)</td>
</tr>
<tr>
<td>Total avoidable inconvenience cost for rechecks and repairs</td>
<td>$97.71</td>
<td>1.54 hours * $49.48 per hour plus $21.54. (Figures may not add up precisely due to rounding)</td>
</tr>
<tr>
<td><strong>Pre-COFs in base case</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average cost for COF-B pre-COF</td>
<td>$126</td>
<td>Same as cost by TSDA</td>
</tr>
<tr>
<td>Time displaced for COF-B pre-COF</td>
<td>1.15 hours</td>
<td>Same as the minimum time assumed for a TSDA COF check. This is the basis that those doing the inspection are more numerous and thus closer (75% the distance) and wait times are reduced because they provide better customer service as they are an open and competitive market</td>
</tr>
<tr>
<td>Value of time for pre-COFs</td>
<td>$34.31 per hour</td>
<td>Valued at same rate as inspections on the assumption that there is the same ability to time pre-COFs to minimise forgone work</td>
</tr>
<tr>
<td>Vehicle operating costs for pre-COFs</td>
<td>$9.23</td>
<td>Assume distance travelled is 75% that for TSDA COFs</td>
</tr>
<tr>
<td>Total avoidable inconvenience cost for pre-COFs</td>
<td>$48.69</td>
<td>1.15 hours * $34.31 per hour plus $9.23</td>
</tr>
<tr>
<td>Volumes of pre-COFs</td>
<td>40%–80% of initial COF volumes Mid-point 60%</td>
<td>Scenario-based assumption, with relatively high degree of uncertainty. Informed primarily by industry engagement that indicates it is quickly becoming commonplace for specialist repairers and for operators themselves to have all the necessary equipment to do COF-equivalent checks. Operators are going to relatively extreme measures to maximise the chance of pass in order to avoid the high inconvenience costs of failure by building pits and installing roller brake machines with load simulation devices</td>
</tr>
<tr>
<td><strong>Avoidable repairs in base case</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volume of pre-COFs subject to excess repair costs</td>
<td>32% of those that have pre-COFs</td>
<td>Based on the COF fail rate, in the absence of better information</td>
</tr>
<tr>
<td>Value of avoidable repairs</td>
<td>$50</td>
<td>Assume 5% (half of WOF’s 10% assumption) of average repair costs of $1000. ($1000 is likely not high, given repairing and maintaining trucks is much more expensive than cars. Eg the average price of a truck tyre is $550)</td>
</tr>
<tr>
<td><strong>Audit costs in base case</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volume of TSDA sites</td>
<td>70</td>
<td>Based on NZTA data 2011/12. Assumed constant over 30 years</td>
</tr>
<tr>
<td>Assumption</td>
<td>Value</td>
<td>Explanation and source</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>TSDA audit cost p.a.</td>
<td>$1,759</td>
<td>NZTA’s current charge of $909.20 escalated by 25% (as it is likely out of date) equals $1,136, plus 3 hours of inspection site’s staff time at $85 per hour equals $255 ($1,391). This happens every 22 months on average (annual average $758). Add $1000 (8 hours at $125 per hour) of random truck inspections per annum</td>
</tr>
</tbody>
</table>
7. Appendix 2 — market structure assumptions

The overall approach to modelling the market structure option is outlined in chapter 4.5. This appendix provides further numerical details to selected sections.

**Initial inspection costs in the market structure option**

In year 6 of the base case the inspection cost of $38.6 million and the voluntary pre-COF of $9.9 million sum to $48.5 million. In the option scenario the cost of voluntary pre-COFs entirely nets off from this figure. For explanation’s sake, if it also cost repairers on average $126 to do an inspection (as it is assumed to for TSDAs) then the total cost of COF-equivalent inspections is $38.6 million. The duplication of $9.9 million spent on “COFs” by these ‘captured’ customers is avoided. However, in year 6 it is assumed that each COF inspection by repairers is about 13% more than TSDA’s, and so total inspection costs are $43 million.\(^{35}\)

In years 1–5 the same rationale applies, except that the avoidance of the duplicated costs of voluntary pre-COFs ramp up linearly from 17 percent in year 1 to 100 percent in year 6.

**Initial inconvenience costs in the market structure option**

The inconvenience costs for voluntary pre-COFs of about $5 million in year 6 net off from the base case inconvenience costs of $19 million to become $14 million.

**Summary of assumptions for the market structure option**

Table 5 Summary of assumptions in market structure option

<table>
<thead>
<tr>
<th>Assumption</th>
<th>Value</th>
<th>Explanation and source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volumes in option scenario</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volumes of inspections</td>
<td>Same as base case</td>
<td></td>
</tr>
<tr>
<td>Transition period to long-run repairer market share</td>
<td>4–6 years. Mid-point 5 yrs. Linear transition path</td>
<td>Scenario-based broad estimate</td>
</tr>
<tr>
<td>Initial inspections in option scenario</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average cost for COF-B by TSDA</td>
<td>$126</td>
<td>As per base case</td>
</tr>
<tr>
<td>Average cost for COF-B by repairers</td>
<td>$139–$164 yr 1 $132–$139 from yr 10. Linear transition</td>
<td>Assume repairers will have additional requirements by the regulator for quality assurance processes. The additional costs are expected to decline as the repair industry innovates and becomes more productive</td>
</tr>
</tbody>
</table>

---

\(^{35}\) In year 6 the inspection cost is $126 for TSDAs and about $142 for repairers (113 percent of $126). With market shares of 15 percent and 85 percent respectively the average inspection charge is $140. With about 307,000 initial inspections the total cost of inspections is about $43 million.
<table>
<thead>
<tr>
<th>Assumption</th>
<th>Value</th>
<th>Explanation and source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoidable repairs in option scenario</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volume of pre-COFs subject to excess repair costs</td>
<td>32% of those that have pre-COFs and go to TSDAs for COFs</td>
<td>As per base case, but scaled according to TSDA market share</td>
</tr>
<tr>
<td>Volume of COF inspections by repairers that require unnecessary repairs</td>
<td>Number of fails by repairers</td>
<td>Follows from the estimated fail and recheck rate scaled by the repairer market share</td>
</tr>
<tr>
<td>Value of avoidable repairs</td>
<td>$50</td>
<td>As per base case</td>
</tr>
<tr>
<td>Audit costs in option scenario</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volume of TSDA sites</td>
<td>8 from year 6 onwards</td>
<td>Based on 15% of market by value</td>
</tr>
<tr>
<td>TSDA audit cost p.a.</td>
<td>$1,759</td>
<td>As per base case</td>
</tr>
<tr>
<td>Repairer audit cost p.a.</td>
<td>$3,005</td>
<td>NZTA’s current charge of $909.20 rounded to $1000 and then escalated by 25% (like the base case) equals $1,250, plus 3 hours of inspection site’s staff time at $85 per hour equals $255 ($1,505). This happens every 12 months on. Add $1500 (12 hours at $125 per hour) of random truck inspections per annum</td>
</tr>
<tr>
<td>Number of repairer sites undertaking COFs</td>
<td>150 – 250, mid-point 200</td>
<td>Scenario-based broad estimate</td>
</tr>
</tbody>
</table>
8. Appendix 3 — Castalia review comments

Castalia was contracted to review earlier draft of the report and their comments are set out below. Castalia’s comments were accepted and CBA results adjusted accordingly.

Vehicle Licensing Reform: Review of COF Cost Benefit Model

28 November 2012

Introduction and Background

Castalia was engaged by the Ministry of Transport to review the cost benefit analysis (CBA) of possible changes to the certificate of fitness (COF) regime. COFs are required for heavy vehicles and light vehicles used to provide transport services (such as taxis). Changes to the ways that COFs are regulated are being considered by the Ministry of Transport as part of a broader package of vehicle licensing reforms.

The two significant reform options analysed in the CBA are:

- To make the market for providing COFs more contestable by allowing repairers to issue COFs or allowing transport operators to self-certify. Currently only independent testing stations (known as Transport Service Delivery Agents, or TSDAs) can issue COFs
- To change the frequency of vehicle inspections, either by allowing greater variation in frequency (between 3-12 months), or by allowing greater variation and making the default inspection frequency every 12 months. Vehicles currently need to be inspected for COFs every 6 months.

This review has been completed by Ben Gerritsen, Managing Director of Castalia in Wellington.

Overall Assessment of the CBA

In our opinion, the CBA of COF reform options is fit for the purpose of informing policy decisions on changes to COF regulation. The CBA identifies and quantifies inefficiencies in the way that COFs are currently carried out, and distinguishes between real economic effects resulting from reform options and transfers between parties that will inevitably occur due to the changes proposed.

Quantifying the economic impacts of COF reform is the subject to uncertainty because the CBA is forward-looking. Accurately identifying the benefits of the proposed changes is particular challenging. The CBA describes two assumptions that have a material impact on the results of the analysis:
• **The market share of testing stations after the reforms.** The reforms will only deliver efficiencies if vehicle owners switch from having their vehicles inspected at TSDAs to using integrated inspection/repair service providers. The CBA assumes that it will take some time for vehicle owners to make this switch (between 4-6 years), and that 15 percent of vehicles will still be inspected by TSDAs after that transition period.

• **The level of wasteful pre-checking that can be eliminated by the reforms.** The CBA assumes that between 40-80 percent of vehicles are submitted to a check as to whether the vehicle meets the COF standard before going for a COF inspection (a “pre-COF check”). This pre-checking is carried out to reduce the risk of failing the COF check, which immediately results in the vehicle becoming unroadworthy.

Despite the high proportion of vehicles that are assumed to have pre-COF checks, the CBA assumes that 32 percent of vehicles fail the first-time COF inspection (based on current failure rates). This apparent discrepancy has been explained by several features of the inspection market, including a market segment that uses COF testing to ascertain vehicle maintenance and repair needs, and the different assessments made by repairers carrying out pre-COF checks and testing stations carrying out COF checks.

The high COF failure rate increases costs through lost productivity when vehicles are taken off the road, and the time taken to transport vehicles between testing and repair facilities and resolve the issues identified. While a proportion of these costs need to be incurred to ensure that only safe vehicles are certified to travel on New Zealand roads, the CBA for the reforms assesses the impact of removing unnecessary costs.

In our view, the current 32 percent COF failure rate seems very high considering the amount of pre-checking that is undertaken and the generally high maintenance standards in the trucking industry: Vehicle owners should also have strong incentives to maintain their vehicles to COF standards because these standards are used by insurance companies when deciding to pay out on insurance claims. The COF reforms that are proposed do not directly target this high failure rate, and the CBA does not assume that the failure rate will fall if the reforms are carried out. The reforms instead focus on how to lower the overall costs of obtaining a COF (including the costs of failing the first-time check).

**Specific Comments**

Our review has identified two areas where changes to the CBA are recommended.

- **The cost of pre-COF checks should be discounted to reflect the ability to schedule these checks during “downtime”**. The inconvenience costs of pre-COF checks in the CBA are calculated at the full opportunity cost of a fully productive truck. In fact, vehicle owners are likely to schedule pre-COF checks during times when the vehicle would not be fully productive, suggesting that it is appropriate to discount the value of time for pre-COF checks in the CBA.

- **The estimate of deadweight costs under the status quo should be reduced or removed**. Based on Treasury guidance on cost benefit analysis, the CBA estimates

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36 See [http://www.treasury.govt.nz/publications/guidance/planning/costbenefitanalysis/primer/09.htm](http://www.treasury.govt.nz/publications/guidance/planning/costbenefitanalysis/primer/09.htm), chapter 2.3.10
the deadweight costs of the wasteful regulation that would be eliminated through the reforms. This approach has strong theoretical foundations—regulation that imposes unnecessary costs will drive a wedge between marginal private costs and marginal social costs. In practice, the actual amount of deadweight loss will depend on the features of the particular market being analysed, and in particular the relative responsiveness of supply and demand to changes in price. These market features will determine the impact that wasteful regulation has on outputs in the market (in this case, the output foregone in the market for heavy vehicles due to wasteful COF regulation). This is illustrated in Figure 11.1.

The assumption adopted in the CBA that the deadweight loss equates to 20 percent of the “revenues” raised from wasteful regulation leads to an effective increase in output of 40 percent. In fact, we would expect the changes in output to be much lower than 40 percent due to the regulatory changes proposed. A more reasonable approach in the absence of information on appropriate market elasticities may be to assume no change in output following the COF reforms, and therefore no benefit in eliminating deadweight loss.

**Figure 11.1 Illustration of the Deadweight Costs of Wasteful Regulation**

![Diagram illustrating deadweight costs](image)

The changes above would both reduce the estimated benefits of Option 1 in the CBA. However, there are some areas where we consider the benefits of reform may be greater than stated in the CBA:

- The cost of having vehicles “off the road” after failing a COF are likely to be significant under the status quo. We would expect the reforms to have the effect of reducing the amount of time that trucks are idle between failing a COF and getting the necessary repairs because an integrated inspector/repairer can better coordinate the activities required to get the vehicles back into productive use.

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37 This implied output increase is a function of the assumption that the deadweight loss equals 20 percent of the “revenue” change. In the figure below: 0.2(p-p') = 0.5(p-p')(q'-q), rearranging gives 0.4(p-p')q = (p-p')(q'-q), which equals 0.4q = q'-q.
The reforms may free up assets that are currently used in TSDAs for other productive purposes. If the reforms increase the utilisation of assets at existing repairers (who now also uses these assets to inspect vehicles), then other assets currently used in the vehicle inspection industry (land and machinery) may have value in other productive uses. Both of these impacts are difficult to quantify. However, it may be worth highlighting these possible benefits in the CBA without quantifying their effects.

**Conclusion**

Our opinion is that the CBA of the COF reform options is fit for the purpose of informing policy decisions on COF regulation. The changes recommended in this note would not change the overall finding that the proposed reforms will have benefits that outweigh their costs.

Please feel free to contact me if you require any further information or wish to clarify any of my comments on the CBA.

Best regards,

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