



**Highways Consultancy Group - Highways Research Group**

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# **Lean Benchmarking of Highways Agency Supply Chain (Phase One)**

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**Project Sponsor: Sue Housley**

## Company Details

Highways Consultancy Group (HCG) and Highways Research Group (HRG) are a multi-disciplinary supply chain comprising over 20 diverse organisations, strategically designed to meet the technical consultancy and research needs of the Highways Agency. The Groups behave as a community, sharing knowledge and working in partnership with the HA.

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## Issue and Revision Record

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0	13/10/2010	CWC (JD/IS/MJM)	JM	DB	First draft of final report for discussion with Sue Housley
1	7/01/2011	CWC (ND)	CWC (JD)	DB	Report for general issue

## Executive Summary

Highways Agency required a benchmark of the current Lean capability of its supply chain, ahead of the deployment of the Highways Agency Lean Metrics and Assessment Toolkit (HALMAT). This report details the results of that benchmarking.

HALMAT is self-assessment tool, developed in the previous research Task 127, to help the Highways Agency obtain an understanding of the maturity of its supply chain in adopting Lean principles.

### Conclusions:

- On a non-evidential, but interrogated basis, it can be concluded that the first and second tier supply base estimates itself to be at about 1.7 on a 0 to 4 scale of maturity for Lean adoption.
- The self-assessment audit was willingly carried out by respondents; the open and non-judgemental way it was carried out has been motivational to the selected organisations to continue developing or adopting Lean principles.
- The audit has indicated a varying level of understanding of Lean both between organisations, parts of the same organisation and supply chain sectors, which is to be expected as many of the companies chosen are only recent adopters.
- This significant test of the maturity tool has suggested several areas where improvement and clarifications can be made to the tool; none of these, however, is major.
- The methodology for carrying out the audit was effective and economical, however a follow up audit utilising the evidential input metrics proposed in HALMAT, is advised within six months of this assessment.
- There is an expectation that a second assessment will produce a set of lower scores as the supply chain becomes more aware of Lean, they will thus become more aware of areas of ignorance of Lean, or where more work is actually needed to achieve a score they previously believe they had achieved.

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## 1. Introduction

As part of its Lean Deployment Strategy within its supply chain, the Highways Agency (HA) developed a self-assessment maturity matrix and a set of metrics, the HALMAT. Ahead of the deployment of this toolkit, the Highways Agency commissioned a survey to benchmark the current maturity in Lean of its supply chain. This report details the results of that benchmarking.

21 suppliers were selected based on importance of spend and obtaining a representative sample across the supply chain (with another being added during the research process). This sample included tier 1 Contractors, tier 2 Contractors, Managing Agent Contractors (MACs), Design Consultants, Tech Managing Agent Contractors (Tech MACs) and Materials suppliers. Some of these suppliers are joint venture organisations and some of the suppliers were involved in the development of the HALMAT toolkit, therefore, were already conversant with the maturity matrix. A full list of suppliers is shown in the appendix.

The survey was conducted using self-assessment, with telephone interviews used to moderate the overall scores in order to provide a useable dataset for benchmarking. This has provided an invaluable insight into how mature the supply chain sees itself being in the adoption of Lean processes. It is believed that this early assessment will not only provide a baseline of the supply chain's perception in its capability, but also support the Highways Agency in developing its deployment strategy and support the adoption of Lean within the supply chain.

## 2. Scope of Project

The benchmarking survey data was collected using the maturity matrix within the HALMAT toolkit. As it was carried out on a self assessment basis no evidence was collected. It is the first extensive use of the maturity matrix, although it was developed and trialled on a number of suppliers in the previous research Task 127.

The HALMAT toolkit has been developed so that suppliers to the Highways Agency can carry out a self assessment on where they are placed in the implementation of Lean. It has three main aims:

- to enable organisations to assess for themselves where their organisation stands in terms of Lean implementation, through a maturity matrix
- to provide input metrics of the activities being carried out by suppliers to adopt Lean principles as a proxy for progress along the path to maturity
- to provide a structured method for the Highways Agency to carry out audits and monitor organisational capability to deliver Lean and its resultant benefits.

The toolkit has been designed for use across the whole Highways Agency supply chain covering several thousand companies and a wide range of different activities, from design to construction & from manufacturing to maintenance, thus the applicability of all its sections vary in some situations. Nevertheless, in most cases each section has relevance.

The maturity matrix self-assessment tool is structured to access progress in organisational capability to deliver Lean. It is very much focussed on input measures, for example, it asks to what extent Lean principles are incorporated into the strategic business plans of the organisation and indeed those of its supply chain. It uses five capability levels from zero to four. There are 10 areas covered:

1. Strategic Use of Lean
2. Lean Leadership
3. Delivering Customer/Client Value
4. Lean Structure and Behaviour
5. Process Focus
6. Standard Work
7. Process Control and Quality
8. Planning, Design and Construction

9. Maintenance

10. Supporting Infrastructure

### 3. Benchmarking Survey

#### 3.1 Methodology for the Benchmarking Survey

The survey was undertaken as follows:

1. The Highways Agency prepared an explanatory video to explain to the supply chain participants the purpose of this survey and ensure a consistent message was being given. The link to this video is [http://www.ha-partnet.net.org.uk/portal/server.pt/community/07\\_-\\_video\\_gallery/756](http://www.ha-partnet.net.org.uk/portal/server.pt/community/07_-_video_gallery/756)
2. The participants were promised that the assessment returns from this survey would be confidential and not used to make procurement decisions.
3. 21 suppliers were selected to take part in the survey – with one further participant joining later on. The basis of the selection was to choose suppliers with significant spend, but also get a distribution of the different types of suppliers across the supply chain. The organisations did include a number of “joint venture” (JV) organisations where a number of suppliers were working in partnership, usually in one of the MAC environments.
4. The maturity matrix (HALMAT version 10.0) was sent to the Lean/Business Improvement contact at each of the organisations (it is worth noting that all 21 organisations surveyed had such a person, this may well not be the case lower down the supply chain). A glossary of terms and instructions on how to complete the survey, together with a proforma upon which to assess the current level (level 0 to 4), were provided. The JV organisations were asked to complete as a unique organisation.
5. The returns were analysed and collated.
6. Once the returns were reviewed, moderation interviews were undertaken over the telephone by the HCG-HRG team. In these moderation interviews various assessments were challenged and tested. Where agreed by the respondents, the assessments were amended.
7. Each of the respondents was provided with a single page of feedback.
8. A report (this document) was written for the Highways Agency detailing the outcomes of the benchmarking survey.

### 3.2 Survey Mechanism

The survey achieved a 100% return rate; therefore, the survey mechanism was successful. The high return rate was no doubt due to personal request in the video explaining the purpose of the survey and the effort that was put in to identify the correct individuals in each organisation. Some individual contact details from the Highways Agency database were incorrect, however, so the correct individual had to be identified. This resulted in delayed submissions as more time had to be allowed for the completion of the self-assessment. In addition, some of the respondents had directly negotiated a later submission with the Highways Agency which became apparent when arranging the moderation interviews.

The methodologies adopted by respondents to completing the maturity varied. Some obtained a consensus view from different parts of the organisation; others completed the matrix based on their individual view. A number of respondents used sophisticated methods such as "Survey Monkey", however 30% of those surveyed asked "what is Lean?" indicating a lack of basic awareness and inadequate internal briefing.

Moderation of the scores was undertaken by the HCG-HRG team in the telephone interviews to each respondent. These interviews interrogated and developed an understanding of the approach to the scoring over a period of 1 - 2 hours. It was found that those who had scored 0 in certain areas were generally moderated up slightly, and those who had scored 4 in certain areas were generally moderated down. The moderation interviews revealed that the respondents who scored highly were more insistent on protecting their scores when challenged. Respondents were asked how long had their organisation been working on Lean and there is evidence that, those organisations who had been involved the longest, tended to be more conservative on their scoring. This suggests they had a better understanding of what was required to have Lean principles fully embedded.

## 4. Overall Benchmarking Statistics

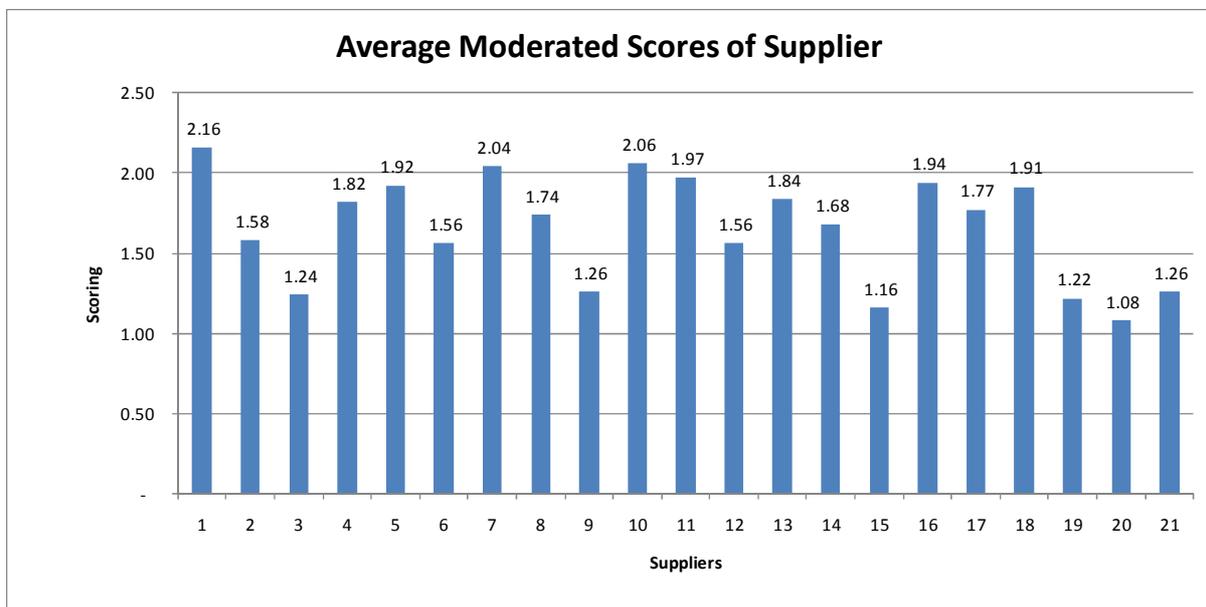
### 4.1 Overview

The following is an overview of the statistics from the moderated responses:

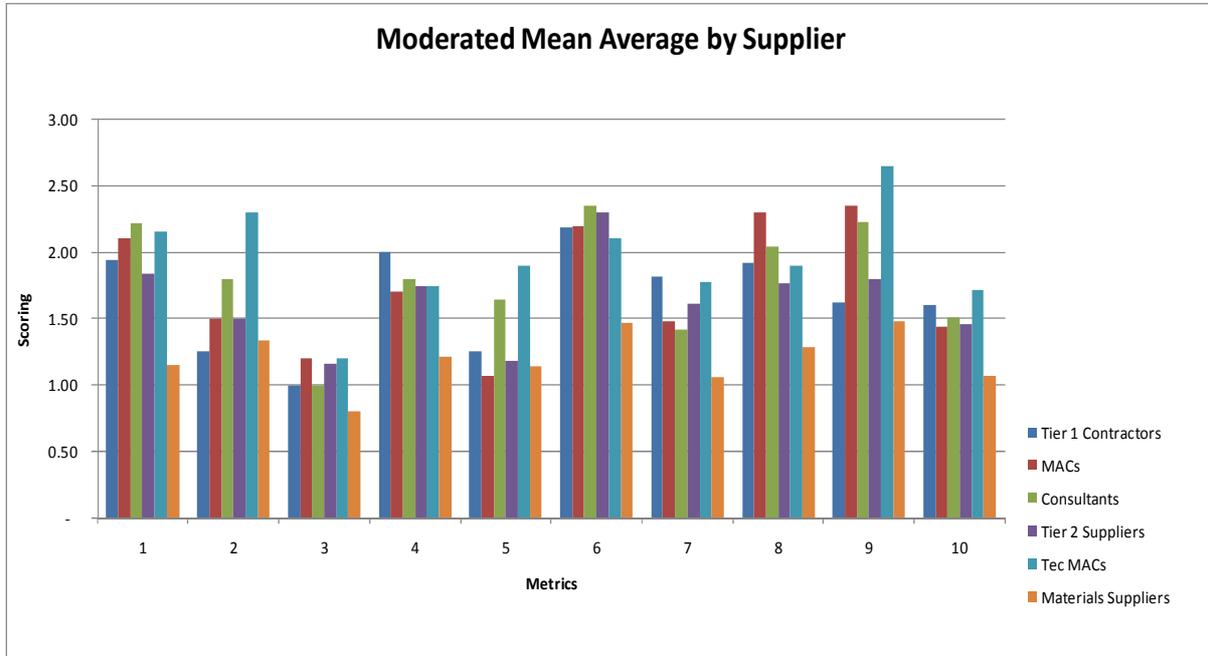
**Table 1 Overall Moderated Statistics**

Overall Moderated Statistics	
Minimum average score	1.08
Lower quartile average moderated score	1.26
Mean average moderated score	1.66
Median average moderated score	1.74
Upper quartile average moderated score	1.93
Maximum average moderated score	2.16

**Table 2 Moderated Average Scores of Suppliers**

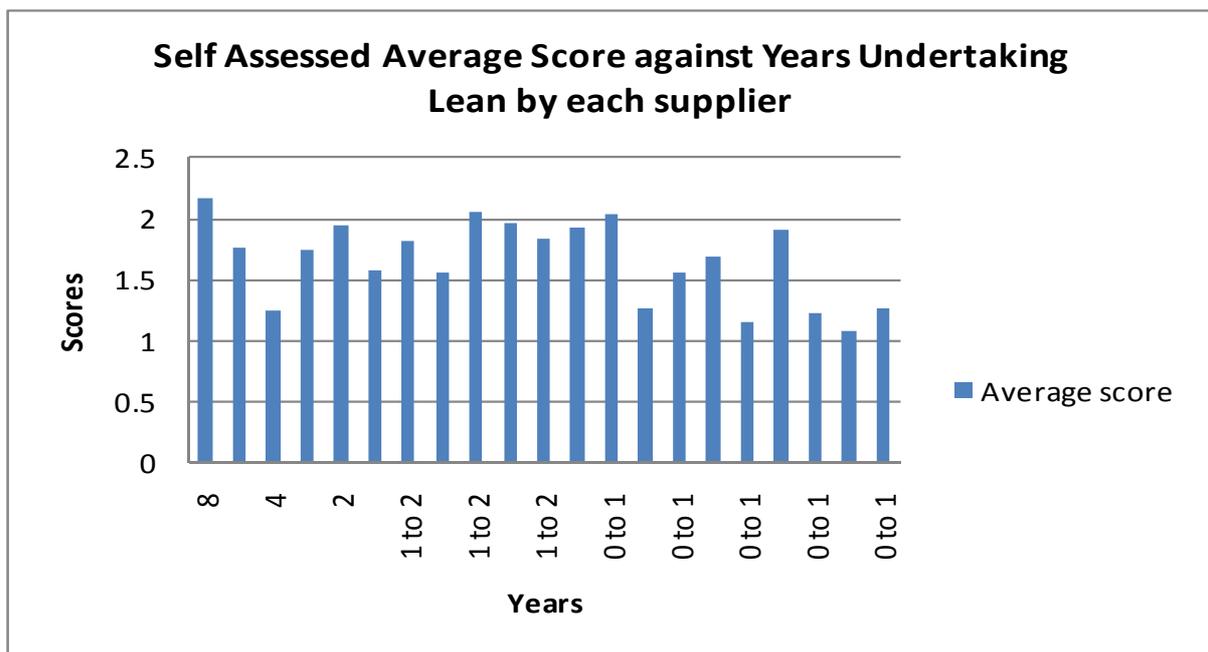


**Table 3 Moderated Mean Average by Supplier**



The table below shows the moderated average score by each of the 21 suppliers who completed the scoring matrix, compared to the number of years that they have undertaken Lean practices and process. This demonstrates that some organisations with 0-2 years experience may be over-assessing themselves at this stage, given the scores which those at the 2-8 years end of the spectrum were scoring:

**Table 4 Self Assessed Average Score against Years Undertaking Lean by Each Supplier**



#### 4.2 Comparison of Re-Measured Self-Assessments between August and November 2010

Three organisations were involved in both the Task 127 development of the HALMAT and the Task herein reported. During Task 127, these three organisations were asked to score themselves by way of testing understanding of tool, which provides a comparison of a first-run score for an organisation first encountering the tool and one doing its 'second pass'. The table below shows a comparison of the self-assessments received in August 2010 and those received in November 2010 from the same organisation.

There is a marked reduction in the scoring. This is most likely due to the fact that the suppliers now better understand the metrics and the scoring methodology. In addition, the moderation has challenged their scoring. It may therefore be expected that the supply chain in general will demonstrate a reduction in scoring the next time they assess themselves using this tool.

**Table 5 Comparison of Re-Measured Self-Assessments between August and November 2010**

			Organisation 1		Organisation 2		Organisation 3	
			Aug-10	Nov-10	Aug-10	Nov-10	Aug-10	Nov-10
1	Strategic Use Of Lean	1.1	1.8	1.5	2	1.5	1.8	1.5
		1.2	0.8	0.9	3	3	1.8	1.5
2	Lean Leadership	2.1	1.8	1	2	1	2.6	1.5
3	Delivering Customer / Client Value	3.1	1.2	0.9	0	0	1.3	1
		4	1.8	1.3	3	2	2	1
4	Lean Structure and Behaviour	4.1	2.5	1.5	3	2	1.9	0.5
		4.2	1.8	1	1	1	1.8	1
5	Process Focus	5.1	2.6	1.5	0	0	2.2	1
		5.2	2	0.8	2	1	1.6	1
6	Standard of Work	6.1	2.6	1.5	3	2	2.8	1
		6.2	1	0.8	3	2	2.3	2
7	Process Control and Quality	7.1	1	0.5	3	0	1.6	1
		7.2	0.8	1.5	3	2	1.7	1
		7.3	1	1.2	3	1	1.8	1.5
		7.4	1.7	1	3	2	2.3	1
8	Planning, Design and Construction	8.1	2	1.6	2	2	3	2
		8.2	0	1	3	3	2.3	2
		8.3	1	1	4	1	2	1.5
9	Maintenance	9.1	0	0.5	4	3	0.9	1.5
		9.2	1.8	0.9	3	2	2.1	2
10	Supporting Infrastructure	10.1	0.8	1.4	2	2	2.1	1
		10.2	2	1.5	3	2	1.8	1
		10.3	1	0.9	1	1	1.8	1
		10.4	0	0.5	2	2	1.4	1
		10.5	1.5	0.8	1	1	1.7	1
	<b>Total</b>		<b>34.5</b>	<b>27</b>	<b>59</b>	<b>39.5</b>	<b>48.6</b>	<b>31.5</b>
	<b>Percentage Improvement</b>			<b>-21.7</b>		<b>-33.1</b>		<b>-35.2</b>

#### 4.3 Statistical Analysis by Type of Supplier

The table and chart below show the statistics split by supplier type showing their mean moderated results

**Table 6 Statistics Split by Supplier Type**

Statistics Split by Supplier Type	
Consultants' mean moderated score	1.8
Tier one contractors' mean moderated score	1.7
MACs' mean moderated score	1.7
Tier two suppliers' mean moderated score	1.6
Materials suppliers' mean moderated score	1.2

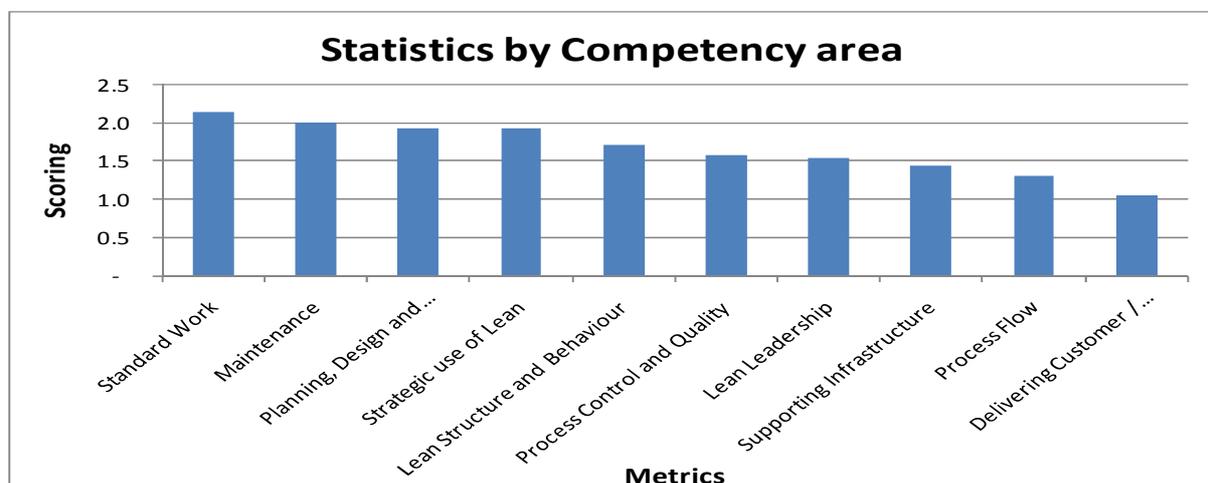
#### 4.4 Statistical Analysis by Competency Area

The table and chart below show the statistics by each of competency area ranked in order of scoring.

**Table 7 Statistics Split by Competency Area**

Statistics Split by Competency Area	
Standard Work	2.1
Maintenance	2.0
Planning, Design and Construction	1.9
Strategic use of Lean	1.9
Lean Structure and Behaviour	1.7
Process Control and Quality	1.6
Lean Leadership	1.5
Supporting Infrastructure	1.5
Process Flow	1.3
Delivering Customer / Client Value	1.1

**Table 8 Statistics by Competency Area**



## 4.5 Notes and Conclusions from the Data

Leadership and supporting infrastructure tended to score low, while operational considerations tended to score higher. This suggests interventions at a site level and 'islands of excellence' are taking place, but that Lean culture is not yet becoming part of organisational leadership & day-to-day working. This indicates that most work needs to be done by the suppliers in this area for them to be able to progress successfully down the Lean path. In addition, without development in such areas, it would suggest that the benefits to the Highways Agency and the suppliers themselves will be confined to project interventions. This will restrict the overall magnitude of the benefits of the adoption of Lean.

### 4.5.1 Impact of Moderation

Overall impact:

- those who scored themselves an overall mean of 1.65 or less had their score INCREASED by a mean of 1.71 maturity points when moderated
- those who scored themselves a mean of over 1.65 had their score DECREASED by a mean of 1.21 maturity points when moderated.

During the moderation process it was evident that some respondents found it difficult how to understand/answer some questions. Those with apparently a deeper understanding of Lean principles appeared better able to understand the intent of the questions and interpret them in ways meaningful to their organisation.

In competency area 10, supporting infrastructure, there was an understandable tendency to answer this section from a total business viewpoint, rather than a specifically Lean viewpoint, this tended to result in higher scores which were moderated lower on review. In addition, in cases where the respondent was a subsidiary organisation of a larger group who had developed a group supplier relationship, the question on supply chain was partly the subsidiaries assessment of the group position which can possibly give unreliable results.

Those scoring highly were generally more vociferous about defending their score – this suggests a lingering fear of an 'absolute score' being used for selection early on rather than a 'focus on the journey'. It further suggests that in the short term, the moderation required from deploying this tool will need to include an assessment of the evidence behind some of these higher scores.

These statistics lend further weight to the defence of high scores issue. The fact that the average movement of the lower scorers was +1.71 maturity points higher across the competency areas, suggests a self-critical approach and a willingness to be 'educated' by the moderators. However, the fact that higher scorers moved down by only an average of - 1.21 maturity points across the competency areas is a product of the defensive stance taken to protect high scores. This position could not be fully challenged and moderated on this project due to the moderation taking the form of a telephone interview. Should this have been a full official supply chain assessment, it may be that these higher figures could be better challenged on the basis of evidence.

There was a significant difference in what people thought a level 4 would look like in their organization. This is not surprising considering the different type of organizations reviewed and as such shows the difficulty in any absolute numerical comparison. This does not mean however that relevant metrics cannot be used to monitor progress, albeit the final destination may differ.

#### 4.5.2 Lessons Learned for Future Assessments

In future assessments a face to face meeting backed by evidence on the scoring would result in more accurate results being recorded. Discussion with some respondents suggested that whilst the possible requirements for metrics were understood, flexibility in their use should be permitted to make them relevant to a particular organisation.

A league table of performance should be delayed for at least one year after launch of the tool. This exercise suggests that the supply chain are very supportive of being monitored on their journey but very concerned at this stage as to comparative performance being used as a basis for selection.

## 5. Conclusions and Recommendations

A number of conclusions can be drawn from the survey:

1. This use of the maturity assessment tool for benchmarking will support the Highways Agency in implementing its Lean strategy throughout its supply chain.
2. Strategically the HA is advised to encourage its suppliers to focus on improving the following competency areas:
  - Lean Leadership
  - strategic use of Lean
  - Lean structure and behaviour
3. Despite some problems, over half the respondents said the survey had been useful to them either in improving their understanding of what needed to be done or in reinvigorating their good intentions to improve. Knowing they are being monitored on their journey appears to have been motivating. Also knowing that the Highways Agency is interested in Lean and prepared to listen to ideas to mutually change processes to improve value & eliminate waste was seen by several participants as encouraging. This response fits well with the Highways Agency Lean strategy. Typical comments were:
  - “The exercise had been very useful and it should help us on our journey. For example, a Client feedback system had been designed but never implemented. This exercise has been re energised.”
  - “The tool was considered to be too manufacturing orientated, but it was explained it had to fit lower tiers of supply chain as well. Nevertheless it was found to be very useful, particularly the indicative evidence.”
4. This arms length audit has provided the Highways Agency with a reasonable snapshot of the state of Lean implementation for first and second tier suppliers. This can only be verified by a smaller in-depth audit, examining hard evidence to support the assessments. In the longer term, monitoring of input metrics should provide confidence in the accuracy of the self assessment results.
5. The Highways Agency’s strategy of seeking to measure & monitor progress of its supply chain in Lean adoption has already shown benefit and provided the ongoing exercise is continued in a flexible manner should steadily produce benefits.

6. Other organisations have found that worthwhile benefits are obtained by sharing good practice in the form of regular seminars or forums. This not only enables suppliers to understand what is possible, but also constrains organisations from making over ambitious claims as to their effectiveness. We would encourage the Highways Agency to include such a programme in the next two to three years, whilst companies are at the early stage of Lean adoption. This might take the form of an annual Supply Chain conference whereby members of the supply chain gather to demonstrate their Lean credentials/tools/etc to their peer group.
7. From the point of view of the benchmarking study, we would suggest that the same group of companies be asked to carry out a similar evaluation in six months time, which should include a request for input metrics to be provided. The suppliers should be notified in the near future to give them time to collect the metrics. The actual metrics submitted should come from the HALMAT metrics list produced in research Task 127.
8. Whilst the process of evaluation was not rigorous and would require some hard evidence when fully deployed, the benefit of evaluating a reasonable sample at an early date, in our view, made this a worthwhile exercise. Indeed as organisations become more mature in adopting Lean principles this self assessment survey approach with experienced assessors could significantly reduce future auditing requirement for resource.