



**NZ TRANSPORT AGENCY**  
WAKA KOTAHI

**Auckland Harbour Bridge**  
**Contract PSMC003**

## **Resource Consents for Discharge of Abrasive Blast Products 2009 Annual Report**

Total Bridge Services  
9 Princes Street  
Northcote  
Auckland, New Zealand  
Telephone :+64 9 481 0078  
Facsimile :+64 9 481 0079  
Date 21 June 2010

Prepared by:

\_\_\_\_\_  
**Ben Cullen**

Approved for release

\_\_\_\_\_  
**Jon Patman**



A JOINT VENTURE BETWEEN TBS, OPUS AND FULTON HOOGAN



## CONTENTS

<b>1 INTRODUCTION.....</b>	<b>2</b>
<b>2 DISCHARGE TO LAND AND WATER .....</b>	<b>3</b>
2.1 Location and Extent of Blasting.....	3
2.2 Abrasive Blasting Products.....	4
2.3 Contamination Recovery.....	5
2.4 Surfaces Coated with Lead.....	5
2.5 Measures undertaken to avoid, remedy, or mitigate any adverse Environmental Effects .....	5
<b>3 DISCHARGE TO AIR.....</b>	<b>8</b>
3.1 Details of blasting .....	8
3.2 Surfaces Coated with Lead.....	8
<b>Appendix A – Abrasive Blasting Data 2008/2009</b>	
<b>Appendix B – Local Resident Survey and Feedback</b>	



## 1 INTRODUCTION

This report has been prepared for the Auckland Regional Council in accordance with the special conditions of consent as set out in the Resource Consent for the Auckland Harbour Bridge (AHB). This report covers the period from 1 October 2008 to 30 September 2009.

The Resource Consents have been granted to Transit New Zealand for the discharge of abrasive blasting products from abrasive blasting of the Auckland Harbour Bridge under the following Discharge Permits:

- Discharge Permit No. 23956 for discharge to air
- Discharge Permit No. 23954 for discharge to ground
- Discharge Permit No. 23955 for discharge to water

All conditions of these discharges permits are being complied with. In accordance with the special conditions of consent the following details are discussed:

- The location and extent of blasting, along with details of conditions
- The estimated quantity (in kg) of abrasive blasting products used
- Confirmation of the quantity of contaminants recovered, stored and disposed
- Confirmation that no more than 10m<sup>2</sup> of blasting has been carried out in those areas where lead paint is known to be present
- Confirmation that no abrasive blasting has been undertaken on surfaces coated with lead with concentrations greater than 5000 parts per million by weight in the dry film or containing other hazardous air pollutants
- Details of measures undertaken to avoid, remedy, or mitigate any adverse environmental effect
- Details of screens used and the areas where they are deployed
- Details of any complaints received, and their nature

The physical works contractor responsible for the painting of the AHB changed on 1 December 1998 from Serco to Total Bridge Services. The Total Bridge Services contract has a contract period of 10 years with a 3 year extension, expiring on 30 November 2011. Total Bridge Services is a joint venture between TBS Farnsworth Limited, Fulton Hogan Limited and Opus International Consultants Limited.





## 2 DISCHARGE TO LAND AND WATER

### 2.1 Location and Extent of Blasting

Over the past twelve months the majority of the abrasive blasting, high pressure water blasting and maintenance painting was carried out on the Original Truss Bridge and the Extensions Gantries. Minor blasting and painting was carried out at the South End where discharge into the storm water system is possible.

The areas painted include;

- Truss Bridge, Below Walkway, Span 1, 9 – 11;
- Truss Bridge, Below Walkway, Span 5, Panel Points 11 – 13;
- Truss Bridge, Above Walkway, Span 7, Panel Points 3 – 7;
- All Extension Gantries.

The total quantity of blasting media used over the past 12 months was 113,669kg. This is an increase on the previous year's usage (67,300kg).

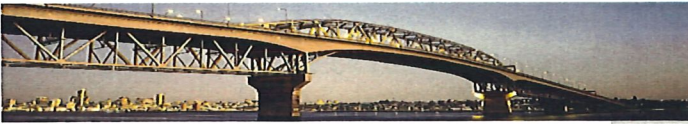
The maintenance work of the original truss under the walkways in Span 1 included the coating of all external steel work from panel points 9-11. This area used a total of 21,225kg, which accounted for approximately 19% of all media used in the past 12 months.

The maintenance work of the original truss under the walkways in Span 5 included the coating of all external steel work from panel points 11-14. This area used a total of 31,949kg, which accounted for approximately 28% of all media used in the past 12 months.

The maintenance work of the original truss above the walkways in Span 7 included the coating of all external steel work from panel points 3-7. This area used a total of 6,750kg, which accounted for approximately 6% of all media used in the past 12 months.

The maintenance works of the extension gantries involves the coating of all steel frameworks of all six gantries. These areas used a total of 53,745kg, which made up approximately 47% of all media used in the past 12 months.





## 2.2 Abrasive Blasting Products

### Quantity of Abrasive Blasting Products Generated

Details of abrasive blasting carried out on the Auckland Harbour Bridge between 1<sup>st</sup> October 2008 and 30<sup>th</sup> September 2009 have been tabulated and included in Appendix A. For each day the location of the blasting, the work hours, wind speed, wind direction, amounts and type of abrasive, and controls have been recorded. Table 1 below gives the approximate amount of abrasive blasting used in each part of the Bridge over the past 12 months, as well as the period of blasting.

**Table 1: Summary of Abrasive Blasting**

Location of Blasting	Period	Approximate Amount of Abrasive Used (kg)
Truss Bridge, Span 1	15/10/8 – 23/2/9	20,225
NWI Gantry	2/2/9 – 13/7/9	16,560
NWO Gantry	4/2/9 – 28/8/9	11,765
Truss Bridge, Span 5, Below Walkway, Panel Point 11 – 12	5/2/9 – 14/4/9	9,399
Truss Bridge, Span 5, Below Walkway, Panel Point 12 – 13	27/3/9 – 27/4/9	11,550
South End	18/10/08	375
EO Gantry	28/3/9 – 14/7/9	6,170
EI Gantry	2/4/9 – 1/7/9	13,975
SWO Gantry	30/4/9	825
SWI Gantry	1/5/9 – 6/6/9	4,450
Truss Bridge, Span 5, Below Walkway, Panel Point 13 – 14	6/5/9	11,000
Truss Bridge, Span 1, Above Walkway, Panel Point 10 – 11	11/5/9	1,000
Truss Bridge, Span 7, Above Walkway, Panel Point 3 – 4	1/9/9 – 18/9/9	3,000
Truss Bridge, Span 7, Above Walkway, Panel Point 4 – 5	21/9/9	750
Truss Bridge, Span 7, Above Walkway, Panel Point 5 – 6	22/9/9 – 24/9/9	2,250
Truss Bridge, Span 7, Above Walkway, Panel Point 6 – 7	30/9/9	750



## 2.3 Contamination Recovery

In accordance with the conditions of the resource consent it is necessary to minimise the discharge of blast media and paint debris as far as is practicable via capture and correct disposal where discharges are over seawater. Where discharges are over land, all debris is to be captured and removed to an appropriate treatment or disposal facility. It has been found that by adopting a sensible, sympathetic approach to the maintenance operations discharge of contaminants has been kept to a minimum. The most effective method to date has been to restrict blasting to minimum practicable surface areas; i.e. spot blasting the corrosion rather than blasting the whole package, this has been successful in keeping the volume of debris from the old paint systems discharged to less than  $0.05\text{m}^3$  per year. Assessments on the environment have shown that the effects from spillage of the coating products to be insignificant under normal working conditions. To date no excessive spills have occurred.

## 2.4 Surfaces Coated with Lead

### Areas with Lead Paint Present

On the bridge there are only two locations where lead based paints are present, span 7 and inside the box extensions. Previously it has been estimated that only  $0.051\text{m}^3$  of red lead paint per panel point remains on the bridge.

### Past 12 Months Coatings Operations

In the past 12 months painting of the East Extension Interior has commenced, the present coating on the inner extension is a lead based paint. Because of this the removal of the existing paint is done by the use of hand tools (scrapers etc) and not abrasive blasting, at the completion of each days work the removed paint is collected and disposed of in the appropriate manner.

### External Coatings Philosophy

It has been estimated in previous contracts that only a very small fraction of this paint (on average 5%, or  $0.0026\text{m}^3$ ) is removed by the spot blasting involved in maintenance painting. The adopted philosophy regarding areas contaminated with lead is such that the corrosion will almost certainly reoccur in the same locations. This means that those areas have been blasted in the past thus removing all lead from the surfaces, any further blasting will only take off reapplied paint systems, which do not contain lead. If the area blasted is greater than has been previously cleaned then it has been found that the additional area is minimal.

## 2.5 Measures undertaken to avoid, remedy, or mitigate any adverse Environmental Effects

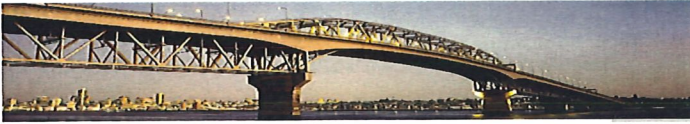
Total Bridge Services over the past twelve months have continued to as far as practicable avoid, remedy, and mitigate any adverse effects on the environment from the abrasive blasting on the Auckland Harbour Bridge. Methods used include:





- From January 2002 we have exclusively been using more garnet abrasive, this has been instrumental in the reduction of abrasive dust generated whilst blasting. Garnet is more efficient due to its hardness and angular profile and therefore a lesser quantity is used to prepare the steel surfaces compared to basalt and other trailed abrasives.
- High pressure water blasting has continued to be used over the past twelve months to remove as much loose paint, scale and corrosion products from the surfaces as possible before abrasive blasting. Water blasting generates paint flakes rather than generating the dust associated with abrasive blasting. Following the water blasting, sweep blasting is used to obtain a surface profile for anchorage of the paint film.
- Continued development of alternative methods of paint removal. UHP waterblasting (water jetting) up to 30,000 psi has been trialled for paint removal over large flat areas – such as the extensions. The main advantage of this system is that dust is minimised, as only a sweep blast is required prior to painting. The major negative impact of this machine is the noise it generates and hence working hours would be slightly reduced so the impact on our neighbours is minimised. The size of the lances used makes this method of preparation unsuitable on the original truss bridge. The option of using UHP as a permanent replacement to abrasive blasting where practicable is still currently under review.
- Surrounding businesses and residents are continually kept informed and updated on information relating to blasting and painting programmes at regular intervals. Quarterly surveys are carried out of the local residents by Total Bridge Services to ensure that over the past twelve months that they were happy with the controls provided, included in the survey was the forward works programme for the remainder of 2008 and 2009. The results are contained in Appendix B.
- Signage was displayed advising motorists and the public of abrasive blasting and coating operations on the Auckland Harbour Bridge.
- The current blasting philosophy is based on spot blasting followed by a light sweep blast. This philosophy together with the high pressure water blasting and ultra high-pressure water blasting where possible minimises the volume of material that is generated. This philosophy has greatly reduced the volume of blasting media used when compared to historical records.
- Long-term solutions are being examined to look at the viability of moving from Moisture Cured Zinc primers to a Thermal Zinc Spray. This is being approached from two different aspects, firstly, in the short-medium term using the thermal zinc spray for spot repairs, and in the long term, complete thermal zinc spraying. Complete Thermal Zinc Spraying is a system that would require the removal of all the existing coating and complete replacement. It has the advantage of reducing the number of spot repairs required, hence the amount of blasting, to a minimum over the foreseeable future. Given the costs associated with this it is





likely that complete removal will be undertaken in various areas as part of the next contract mainly due to the excessive film thicknesses now present on the bridge.



### 3 DISCHARGE TO AIR

#### 3.1 Details of blasting

As mentioned above the majority of the work carried out between October 2008 and September 2009 occurred on the original truss bridge in Spans 1, 5, & 7, and on the Extension Gantries. Details showing the date and time of commencement and duration of dry abrasive blasting and/or spray painting, areas of the bridge being blasted or painted, the type of abrasive used, wind speed and direction, and any control measures undertaken have been tabulated and can be found in Appendix A.

#### 3.2 Surfaces Coated with Lead

Over the past twelve months it has been ensured that no blasting has been undertaken on surfaces coated with lead with concentrations greater than 5000 parts per million by weight in the dry film or containing other hazardous air pollutants. As has been mentioned above, corrosion on the bridge occurs repeatedly in the same location meaning the lead paint has been removed in the past.



# APPENDIX A

## Abrasive Blasting Data 2008/2009





Date	Work Package	Weather Conditions	Rain	Wind Direction	Wind Speed	Humidity	Steel Temperature	Dew Point	Abrasive Type	Amount Used	Amount Recovered	Screens Used	Signage Used	Sweeping Completed
10/10/2008	N.A.	Clear	Nil	SW	7	50	16	6	Nil Used	0	0	No	No	No
13/10/2008	N.A.	Overcast	Nil	E	6	71.9	17	11.9	Nil Used	0	0	No	No	No
15/10/2008	Span 1	Clear	Nil	NE	3	68.4	18	12.1	Garnet B	0.45	0	No	No	No
17/10/2008	Span 1	Overcast	Light	SW	4	71.1	16	10.7	Garnet B	0.375	0	No	No	No
18/10/2008	South End	Overcast	Nil	SW	8	80	15	12	Garnet B	0.375	0	No	No	No
21/10/2008	Sp 1	Overcast	Nil	SW	3	70.7	18	10.7	Garnet B	0.25	0	No	No	No
22/10/2008	Sp1	Clear	Nil	N	2	79.87	15	11.56	Nil Used	0	0	No	No	No
26/10/2008	N.A.	Overcast	Light	SW	8	83.82	13	10.33	Nil Used	0	0	No	No	No
30/10/2008	Span 1	Overcast	Nil	SW	6	67.6		10.97	Nil Used	0	0	No	No	No
31/10/2008	Span 1	Overcast	Nil	SW	6	62.76	16	9.38	Garnet C	0	0	No	No	No
3/11/2008	Span 1	Clear	Nil	NW	0	76.77	17	13.38	Nil Used	0	0	No	No	No
5/11/2008	Span 1	Overcast	Nil	W	8	90.58	17	16.44	Nil Used	0.25	0	No	No	No
7/11/2008	Span 1	Overcast	Nil	W	8	79.87	15	11.56	Nil Used	0.25	0	No	No	No
8/11/2008	Span 1	Clear	Nil	SE	4	61.1	15	7.57	Garnet C	0.25	0	No	No	No
10/11/2008	Span 1	Overcast	Nil	NE	3	72.74	18	13.04	Nil Used	0	0	No	No	No
12/11/2008	Span 1	Clear	Nil	SW	3	67.74	22	15.76	Nil Used	0	0	No	No	No





## AHB Local Residents Quarterly Survey Report

<b>Sent out:</b>	10 <sup>th</sup> June 2009
<b>Received:</b>	3 responses of 29 sent

### Complaints regarding work on the Bridge

- No complaints made

### Are they being adequately informed?

- All said they were kept well informed and were happy with the conduct of the guys around the site

### Suggestions and Comments

- Found staff have been co-operative, friendly and informative

### Actions/Responses

- None, however we need to encourage people to send responses back as 3 responses is not enough



## AHB Local Residents Quarterly Survey Report

<b>Sent out:</b>	25 <sup>th</sup> March 2010
<b>Received:</b>	3 responses of 29 sent

### Complaints regarding work on the Bridge

- A clanking noise getting worse – believes it is from the expansion joints

### Are they being adequately informed?

- All said they were kept well informed and were happy with the conduct of the guys around the site

### Suggestions and Comments

- Found staff have been co-operative, friendly and informative

### Actions/Responses

- Speak to residents at <sup>s9(2)</sup><sub>(a)</sub> about the noise and find out what the cause is and any possible solutions