



## Technical Report

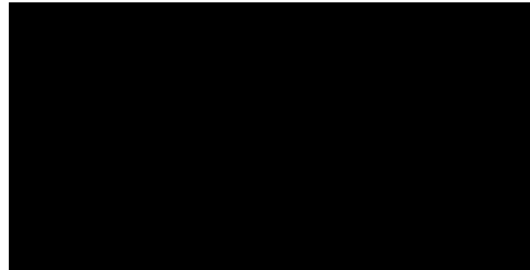
### MAN Lion's Explorer – Windscreen replacements

**Report Date:** 14 April 2011

**Customer Company:**

**Client Responsible person:**

**Site:**



Executive Summary
<ul style="list-style-type: none"><li>• The replacement data does not support a latent defect claim</li><li>• Left windscreens were replaced in only 22% of the fleet in one year</li><li>• It is recommended that the situation is monitored, but that no action be taken at this stage other than normal maintenance.</li></ul>

**Vehicle Detail**

<b>Registration Number:</b>	Various
<b>VIN:</b>	
<b>Body Make:</b>	MAN
<b>Body Model:</b>	Lion's Explorer
<b>Chassis Make:</b>	MAN
<b>Fleet Number:</b>	Various
<b>Distance Reading:</b>	Various

**Inspector Detail**

<b>Inspector:</b>	D Brand (N.Dip. Eng. Mech)
<b>Cell phone Number:</b>	082 773 9832
<b>Fax Number:</b>	086 514 3948
<b>E mail address:</b>	dewald@coltique.com

**Client Detail**

<b>Inspection date:</b>	31 March & 1 April 2011
<b>Contact Person:</b>	
<b>Contact Telephone Number:</b>	
<b>Contact Fax Number:</b>	
<b>Contact E mail:</b>	
<b>Address:</b>	
<b>City (Site Location)</b>	Johannesburg
<b>Nature of Business</b>	Passenger Transport
<b>Observer Name:</b>	

<b>Date</b>	
<b>Signature</b>	

## 1) Inspection Introduction

Multiple complaints from various depots within Autopax has highlighted a possible problem with the left hand windscreen of the MAN Lion's Explorer vehicles. MAN was notified of the problem but no apparent solution was forth coming. This report details all relevant information.



## 2) Detail

Several observations were made where the left hand windscreen started moving out of the body frame. In some instances the windscreens also cracked in the lower corner areas.



### **3)Scope of Inspection**

All related vehicles available at the Pretoria and Johannesburg depots on 31 March and 1 April 2011 respectively, were inspected. Furthermore all information available were analysed.

### **4)Method of Inspection**

A single vehicle was tested on equipment at the Pretoria workshop. (Suspension play detector/ Brake tester) This test was conducted to show any movement in the body structure related to travel on the road. The test method included vigorous shaking of the vehicle with movement of the plates under the front wheels. This test demonstrated no abnormal movement in the body frame that could contribute to the windscreen problem.

A second test was conducted by operating the pneumatically operated passenger door. This test however created excessive movement in the sub frame under the left side dash board. The results was verified on multiple vehicles by simple operation of the door.

### **5)Method of data collection**

Related data was requested form all workshops including the body shop and the risk department. No useful data was available. The bases of this report is purely data from the procurement system of actual payments made. No warranty data was available and is thus excluded from the analysis. If more data is made available, more conclusive analysis could be performed.

### **6)Observations and related information**



Location of actuation piston.

Excessive movement is evident around the anchor-point and the dashboard (in picture). Movement is also evident on the outside (under left windscreen)



An example of a windscreen that moved to the left



Frontal view of the anchor bracket of the actuation piston

This bracket transfers all forces related to the door into the sub structure. The forces are demonstrated in the analysis section of this report.

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<b>Paid Windscreens Replacements (All depots)</b>				
<b>Vehicle</b>	<b>Date</b>	<b>Purchase Number</b>	<b>Price</b>	<b>Description</b>
2000	16 November 2010	4100010381	R 5,551.80	Right hand windscreen
2001	10 July 2010	4100003280	R 6,280.00	Right hand windscreen
2002	1 December 2010	4100011421	R 6,100.00	Unknown
2002	13 July 2010	4100003443	R 6,080.00	Right hand windscreen
2004	23 November 2010	4100010916	R 5,645.68	Left hand windscreen
2004	7 January 2011	4100012879	R 6,426.86	Left hand windscreen
2005	18 January 2011	4100013441	R 6,426.00	Left hand windscreen
2007	18 August 2010	4100005739	R 4,161.00	Right hand windscreen
2008	8 July 2010	4500001160	R 4,161.00	Right hand windscreen
2009	29 December 2010	4100012614	R 12,853.73	Both windscreens
2010	29 December 2010	4100012607	R 6,426.86	Right hand windscreen
2010	7 March 2011	4100016520	R 12,853.72	Both windscreens
2012	29 December 2010	4100012613	R 1,368.55	Refit Left windscreen
2013	21 June 2010	4100001724	R 500.00	Refit Left hand windscreen
2013	23 September 2010	4100007354	R 741.00	Refit Left windscreen
2013	30 December 2010	4100012599	R 4,161.00	Left hand windscreen
2017	4 January 2011	4100012786	R 4,161.00	Right hand windscreen
2021	12 October 2010	4100008338	R 6,080.00	Right hand windscreen
2021	21 January 2011	4100013784	R 6,426.86	Left hand windscreen
2022	22 October 2010	4100008887	R 8,322.00	Both windscreens
2023	23 June 2010	4100001527	R 5,100.00	Right hand windscreen
2026	18 August 2010	4100005810	R 4,161.00	Left hand windscreen
2027	16 November 2010	4100010403	R 4,810.80	Left hand windscreen
2028	26 July 2010	4100004493	R 6,536.00	Right hand windscreen
2030	22 October 2010	4100008921	R 8,322.00	Both windscreens
2031	17 January 2011	4100013393	R 4,161.00	Right hand windscreen
2034	13 September 2010	4100006704	R 8,322.00	Both windscreens
2034	17 November 2010	4100010509	R 4,161.00	Right hand windscreen
2036	17 March 2011	4100017249	R 1,368.55	Refit Left windscreen
2043	7 January 2011	4100012899	R 12,853.72	Both windscreens
2049	13 January 2011	4100013120	R 1,368.55	Left hand windscreen
2049	4 January 2011	4100012762	R 1,368.55	Refit Left windscreen
2049	9 January 2011	4100012937	R 12,200.01	Both windscreens
2052	4 January 2011	4100012759	R 6,100.00	Right hand windscreen
2052	6 January 2011	4100012882	R 1,368.55	Refit Left windscreen
2057	26 January 2011	4100014160	R 6,100.00	Right hand windscreen
2058	19 December 2010	4100012285	R 1,368.55	Refit Right windscreen
2058	26 October 2010	4100009057	R 6,080.00	Unknown
2058	4 January 2011	4100012790	R 1,368.55	Refit Right windscreen
2060	22 July 2010	4100004289	R 6,080.00	Right hand windscreen
2060	23 December 2010	4100012470	R 6,426.86	Right hand windscreen

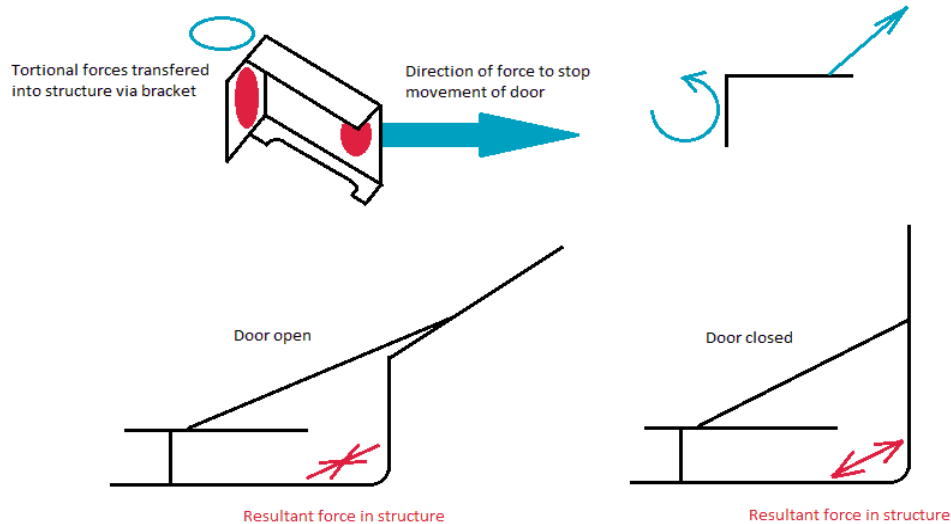
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2060	4 March 2011	4100016341	R 12,853.72	Both windscreens
2061	15 November 2010	4100010248	R 6,100.00	Unknown
2061	21 February 2011	4100015568	R 6,100.00	Right hand windscreen
2062	17 November 2010	4100010542	R 12,200.01	Both windscreens
2062	23 December 2010	4100012428	R 7,207.14	Left hand windscreen
2063	13 September 2010	4100006703	R 741.00	Refit Left hand windscreen
2063	23 July 2010	4100004387	R 8,322.00	Both windscreens
2064	19 January 2011	4100013628	R 1,995.00	Right hand windscreen
2066	11 August 2010	4100005446	R 10,199.99	Both windscreens
2067	19 January 2011	4100013542	R 4,161.00	Left hand windscreen
2071	5 August 2010	4100005182	R 5,100.00	Right hand windscreen
2074	26 July 2010	4100004547	R 6,080.00	Right hand windscreen
2075	23 December 2010	4100012512	R 8,322.00	Both windscreens
2078	21 February 2011	4100015583	R 6,426.86	Left hand windscreen
2086	24 December 2010	4100012516	R 1,157.80	Refit Left windscreen
2090	20 July 2010	4100004113	R 1,111.50	Refit right windscreen
2093	5 July 2010	4100002697	R 5,100.00	Left hand windscreen
2097	1 September 2010	4100006219	R 3,172.28	Unknown
2101	17 March 2011	4100017257	R 12,853.72	Both windscreens
2102	24 January 2011	4100013903	R 649.80	Refit Right windscreen
2103	2 July 2010	4100004045	R 5,100.00	Right hand windscreen
2105	13 December 2010	4100012093	R 6,100.00	Left hand windscreen
2105	21 February 2011	4100015546	R 741.00	Refit Left windscreen
2109	20 July 2010	4100004117	R 5,100.00	Left hand windscreen
2199	15 September 2010	4100006942	R 5,100.00	Right hand windscreen

Summary							
Left replaced	Right replaced	Unknown replaced	Total replaced		Refit Left	Refit Right	Total refit
26 (40%)	35 (54%)	4 (6%)	65		10 (71%)	4 (29%)	14

## 7) Analysis

- Qualitative analysis of the forces in the structure:



- The effective stress and release of the door results in tension and release in the structure under the windscreen.
- Higher than average re-fitments for the left hand windscreen supports the analysis
- Analysis of the replacement data shows the following results (all results from 1 April 2010):

Left side re-fitments	8 Vehicles – (2049 x2)
Vehicle history with left side re-fitments	2012 – Refit only 29 December 2010
	2013 – Refit 1 June 2010 - Refit 23 September 2010 - Replacement 30 December 2010
	2036 – Refit only 17 March 2011
	<b>2049 – Refit 4 January 2011</b> <b>- Replacement 9 January 2011</b> <b>- Refit 13 January 2011</b>
	2052 – Replacement Right 4 January 2011



	- Refit 6 January 2011 (Left)
	<b>2063 – Replacement 23 July 2010 - Refit 13 September 2010</b>
	2086 – Refit only 24 December 2010
	<b>2105 – Replacement 13 December 2010 - Refit 21 February 2011</b>
Windscreen costs	48 vehicles out of 110 (44%)

## 8) Conclusion

- ✧ The quantitative analysis indicates that there are only isolated cases of windscreen fitments or structural problems with the MAN Lion's Explorer body. The extend and frequencies of the incidents indicates that the cause is more likely due to be poor workmanship than a latent defect. The replacement frequencies is in line with an operation of this sort.
- ✧ The qualitative forces analysis indicates that there are some movement in the left sub structure.
- ✧ Replacement of right (54%) vs left (40%) windscreens indicate that the right side is more likely to be replaced than left and thus contradicts the claim investigated.  
(6% unknown due to lost information)

## 9)Recommendation

- ✧ It is recommended that no external action be taken at this stage other than continued monitoring of the situation.
- ✧ In order to minimise the forces resulting in the system, it is recommended that the supply pressure be reduced to a minimum workable level (6 bar).
- ✧ It is further recommended that an effective system to capture the history be implemented to aid future investigations

**End of Report**