

Static Stability Tilt Test

Millbrook Proving Ground Ltd.	
Project	VG0356-001-01
Datapak	MBK16/0491
Test Date	24/05/2016
Issue Date	26/05/2016



Test Vehicle Details

Vehicle Make:	Alpha Grip
Vehicle Model:	Scarab XL
Vehicle Identification No.:	Not Known
Total Permissible Mass (kg):	Not Known
Permissible Front Axle Load (kg):	Not Known
Permissible Rear Axle Load (kg):	Not Known
Tyre Make and Model:	Continental Contract AC70G
Tyre Size:	425/55 R17 MPT
Tyre Pressures (psi):	As delivered
Camera Boom Arm:	Alpha Grip Moviebird 60
Vehicle Test Load:	80 kg Driver, 80 kg Passenger
Vehicle Test Setup:	Neutral, Park Brake OFF



Figure 1 - Test Vehicle

Result Overview

Configuration	Configuration Description	Result
1	Rear bed straight, no weights on crane	23.4
2	Rear bed leant over, no weights on crane	29.7
3	Rear bed straight, 616 kg on each side of crane	20.5
4	Rear bed leant over, 616 kg on each side of crane	26.7

Issue No.	Effective Date:	MBK16/0491
1	26th May 2016	Page 1 of 5

Instrumentation

Instrumentation	Serial No.	Calibration Due
Inclinometer, Platform	21-0095-48	Apr-17
Inclinometer, Body Front	21-2508-16	Feb-17
Inclinometer, Body Rear	21-MPG187	Apr-17
Tyre Pressure Gauge	N/A	N/A
Millbrook Weather Station	03-1363-40	Jan-17

Weather Conditions

Average Wind Speed (m/s):	4.3
Average Wind Direction (°):	42.5
Tilt Axis (°):	240° / 60°

Contact Details

Author:	Luke Robey
Position:	Test Engineer
Department:	Vehicle Measurement
Email:	luke.robey@millbrook.co.uk
Phone Number:	+44 1525 408 443
Approver:	Rob Taylor
Position:	Project Engineer
Department:	Vehicle Measurement

Tilt Test Results

Configuration 1

Rear bed straight
No weights on crane

RH Tilt Test	Rear Wheel Lift (°)
Platform	23.4
Body Front	24.4
Body Rear	29.5



Figure 3 - Config. 1, Front View, 23.4° Platform



Figure 4 - Config. 1, Rear View, 23.4° Platform

Configuration 2

Rear bed leant over
No weights on crane

RH Tilt Test	Rear Wheel Lift (°)
Platform	29.7
Body Front	31.0
Body Rear	21.9



Figure 5 - Config. 2, Front View, 29.7° Platform



Figure 6 - Config. 2, Rear View, 29.7° Platform

Tilt Test Results

Configuration 3

Rear bed straight
28 x 22 kg plates on each side of crane

RH Tilt Test	Rear Wheel Lift (°)
Platform	20.5
Body Front	21.1
Body Rear	24.2



Figure 7 - Config. 3, Front View, 20.5° Platform

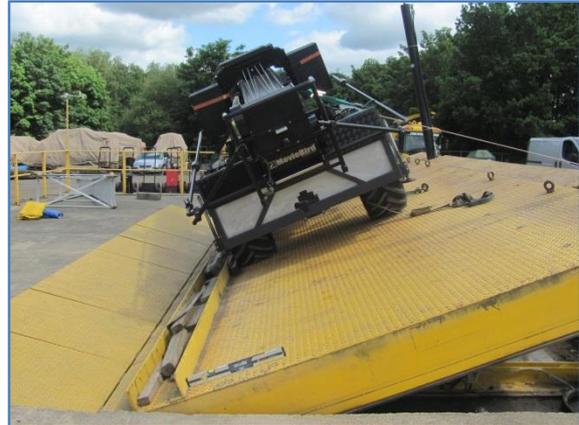


Figure 8 - Config. 3, Rear View, 20.5° Platform

Configuration 4

Rear bed leant over
28 x 22 kg plates on each side of crane

RH Tilt Test	Rear Wheel Lift (°)
Platform	26.7
Body Front	27.8
Body Rear	19.2



Figure 9 - Config. 4, Front View, 26.7° Platform



Figure 10 - Config. 4, Rear View, 26.7° Platform

Conclusions

Tilting the rear bed away from the direction of tilt resulted in an increase in rear wheel lift angle of 6.2 degrees with the weights attached to the crane, and by 6.3 degrees without the weights.

Moving all weight from the stowage boxes onto the crane resulted in a decrease in rear wheel lift angle of 2.9 degrees with the rear bed straight, and by 3.0 degrees with the rear bed leant over at its maximum away from the direction of tilt.

An overall increase in rear wheel lift angle of 9.2 degrees was achieved as a result of moving weight from the crane into the rear stowage lockers, and tilting the crane column away from the angle of tilt.

During all tests, the rear wheel was the only one to lift. The vehicle was articulated between the front and rear axles, and as a result when the rear axle lifted, it was not held down by the front wheels, so all platform angles referred to as "rear wheel lift" should also be considered as the vehicle's roll over angle.

Recommendation

Millbrook would recommend that the weights are removed from the crane and placed within the rear stowage lockers, and that the crane is tilted away from the angle of tilt, whenever the vehicle is traversing a side slope.

It is not possible for Millbrook to recommend safe operating conditions for the vehicle, as all tests have been conducted statically. However, a suitable safety factor should be incorporated when determining the safe operating conditions of the vehicle.