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Report on

LPI GRIP FIELD TESTS

November 2005– March 2007

For

Lightning Protection International Pty Ltd
16 Mertonvale Circuit, Kingston TAS 7050

By

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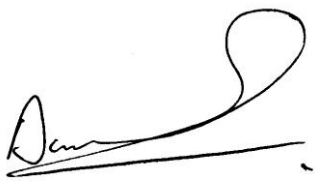
Report Number 200701 **Date**: 4 April 2007 **Number of pages**: 5

Test Object: **GRIP Ground Enhancement Compound**

Tests Performed by: Rohan Thurstans BE Lightning Protection International Pty Ltd

Signed:  Date: _4 April 2007___

Tests certified by: David Edwards School of Engineering, University of Tasmania



Signed: Date: _4 April 2007___

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2. Introduction:

Commencing November 2005 a field test was carried out to compare the resistance to ground of a short (1m) buried earth bar treated with LPI GRIP (Ground Resistivity Improvement Powder) to bars untreated. The test was carried out for more than 12 months in sandy loam soil (poor conditions, high untreated resistivity).

3. Test Arrangement:

7 Samples of 1m x 25mm x 3mm copper bars were buried at a depth of 300mm, 3 of these samples were treated with GRIP as per the manufacturers instructions. The instructions required that the bars be place in a trench 300mm wide, which had been saturated with water. 333g of GRIP mixed with 666ml of water was then applied to the base of the trench and the bar.

Each sample was separated by at least 2m (see Appendix B: - Enhancement Compound Test Layout – GRIP). Each sample bar was connected via insulated cable to a centralised earth pit to aid testing.

The samples were arranged in two parallel trenches separated by 4m. The trenches were placed on gently sloping ground at least 10m from any services or buried metal.

4. Test Procedure:

Resistance measurements were taken using either a Yokagawa Earth Tester Type 3235 or Metrel Smartec MI2124 using the three pin fall of potential method. For each sample 3 measurements were made with different pin placing to confirm the “voltage“ pin was in the plateau section of the fall of potential.

Ten sets of measurements were taken over a 17 month period.

5. Discussion:

Throughout the study results were very consistent between the 3 measurements made with different pin placements.

Some considerable variation was noted between samples in the left trench versus the right with the left trench showing consistently higher results. This may have been due to increased rain run off reaching the right hand trench. The lay of the land in general was high to the right of the trenches and low to the left. However there was a small dip in the lay of the land between and roughly parallel to the trenches, which may have channelled some run-off away from the left-hand trench. This may have slightly negated some of the difference between treated and non-treated samples as there were two untreated samples and only one treated in the right hand trench.

Results varied considerably from one set of measurements to the next, probably due to soil moisture. Results varied considerably from one sample to the next of the same type probably due to soil moisture and to a lesser extent soil resistivity.

During some dry periods it was found that some samples exhibited resistance above the capability of the Yokogawa meter. For later tests, measurements were also taken with the Metrel meter. Results between the two meters were in good agreement where results were within the capability of both meters.

A clear difference was noted between the treated and untreated samples. The results once averaged for the treated samples were less than one third that of the averaged untreated results. This performance is far better than might be expected based on calculations based on modified soil resistance.

6. Results

GRIP Field Tests adjacent to LPI Premises, Kingston, 2005 -

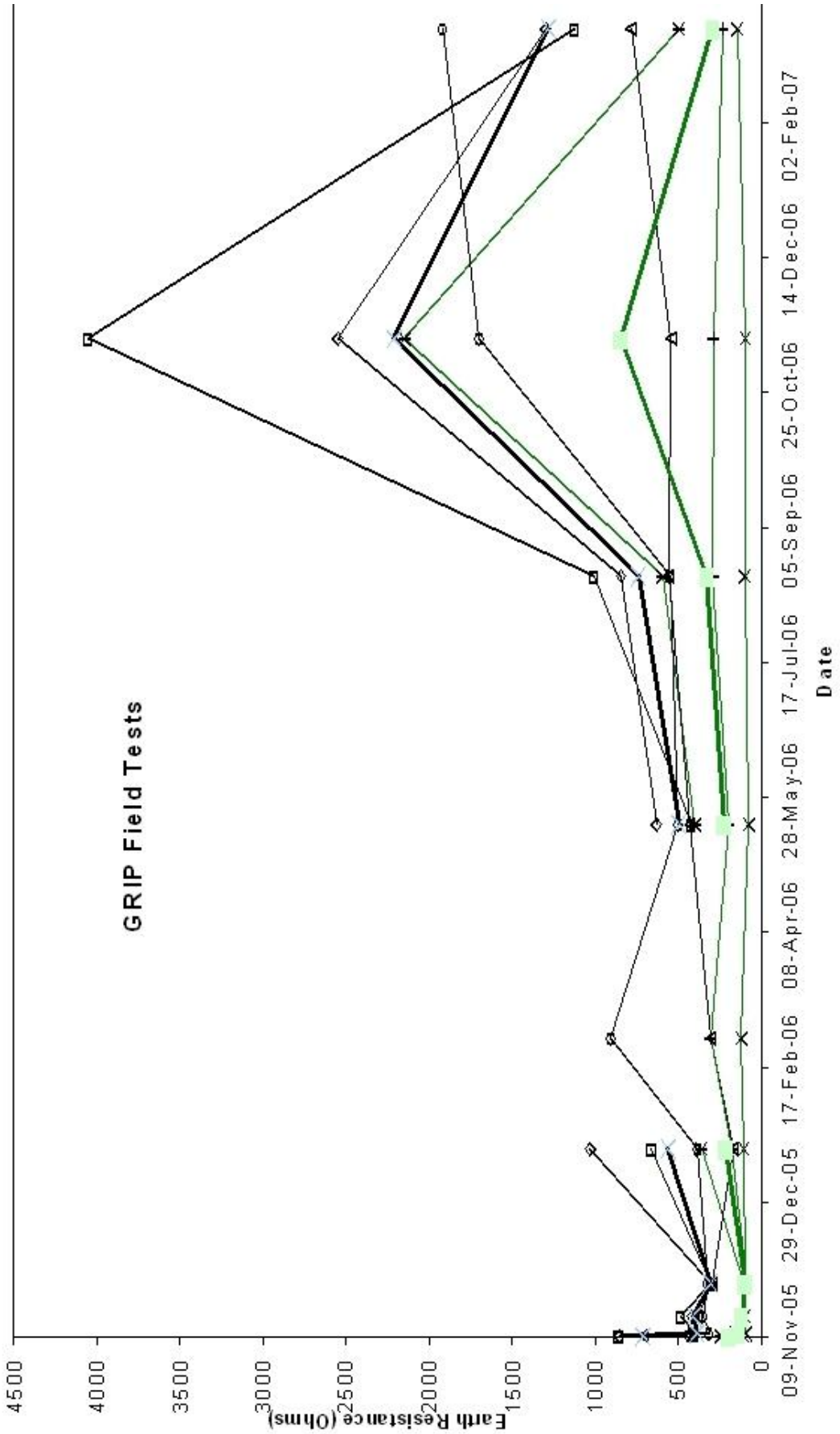
Date	GRIP 1	GRIP 2	GRIP 3	Untreated 1	Untreated 2	Untreated 3	Untreated 4	GRIP Average	Untreated Average	Comments
Overall Averages	201	515	103	931	477	1036	719	273	791	GRIP ~1/3 of untreated resistance
9 Nov 05	240	243	108	857	710	857	432	197	714	
10 Nov 05	160	157	96	430	412	403	313	138	390	
17 Nov 05	128	123	100	422	385	487	350	117	411	
29 Nov 05	91	106	96	302	298	307	322	98	307	
18 Jan 06	179	362	107	1033	173	662	383	216	563	
28 Feb 06	308		121		307		907			Some samples above meter capability
18 May 06	196	400	76	633	432	420	500	224	496	
18 Aug 06	293	597	100	847	557	1007	553	330	741	
14 Nov 06	289	2150	97	2553	544	4053	1698	846	2212	
9 Mar 07	236	496	145	1299	786	1125	1918	292	1282	

Note: On 28 Feb 06 some results were above the capability of the Yokogawa meter and the Metrel meter was not available. All results from this date have been excluded from the averages.

7. Conclusion:

It is clear from the results that LPI GRIP has a dramatic effect on resistance to earth of buried bar or tape under poor soil conditions. It is expected that similar improvement would be likely for other buried copper systems such as buried rods. The effect is dramatic with average resistances shown to be less than one third that of untreated bar.

8. Appendix A - Graphical Results



9. Appendix B- Plan of Test Site