

4/5/06

Summary of ShockLog Results-First Article Undulator Shipment from Metalex

The first article Undulator from Metalex was shipped on 4/4/06. The Undulator was packed inside of a wooden shipping crate isolated from the outside of the box through the novel use of multiple tire inner tubes inflated around the Undulator along the entire Undulator length. The ShockLog monitor, supplied and installed by Metalex, was mounted directly to the Undulator in the center and was accessible through an access panel on the outside of the crate. The Undulator was shipped via truck from Metalex in Cincinnati, Ohio to ANL in one continuous trip. Figure 1 provides the ShockLog monitor summary report for this shipment.

Time of Loading at Metalex: 4/4/06 7:00 A.M. EST
Time of Unloading at ANL: 4/5/06 12:00 A.M. CST

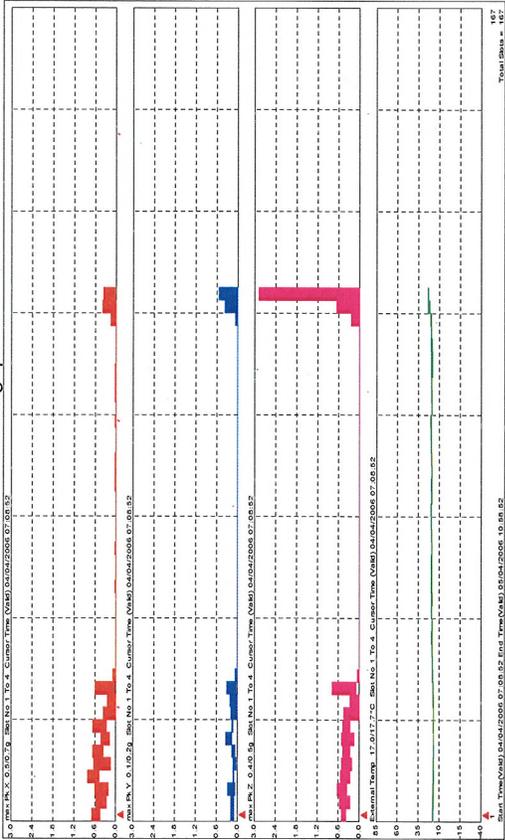
- The most severe shock event occurred when the Undulator was unloaded at ANL at approximately 12:00 A.M. on 4/5/06. This shock was just slightly over 0.75 g's, a very low value. See Figure 2. In terms of modulus, defined as the square root of the sum of the squares for the tri-axial accelerations, a value of only 1.013 g's was generated during this event as can be seen in summary of peak accelerations in Figure 1.
- At the time of loading at Metalex the most severe shock was only around 0.50 g's. See Figure 3.
- During transport the most severe shock was only around 0.75 g's. See Figure 4.
- At no time during loading, unloading, or transport did the ShockLog monitor register an alarm. The alarm threshold was set at 1.5 g's.
- The method of packing seems to work very well, far superior to the results obtained with previous Undulator shipments. The tire inner tube packing method reduces the level of vibration experienced by the Undulator approximately an order of magnitude from what the outside of the crate likely experiences during transport.

Report of file "Metalex1Article"

Comment	Start: 04/04/06 07:07	Download Date	05/04/06 10:01
Report	End: 05/04/06 11:02	Recorded Duration	27 hours, 50 minutes
Serial No	13822	HPT S/N	766

External Temperature (°C)	Min	Max
	+16.3	+23.3

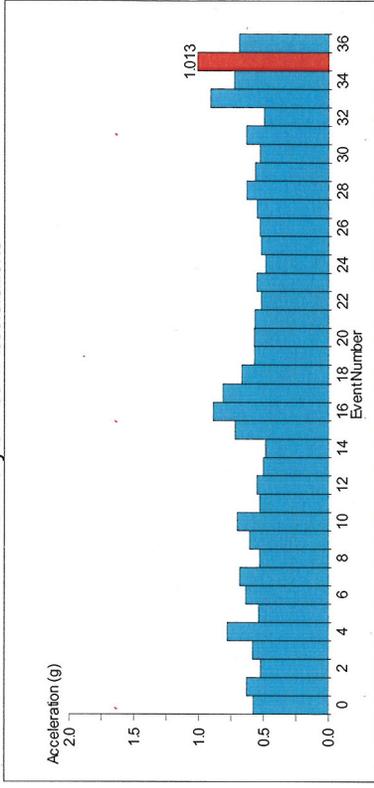
Time Slots graph



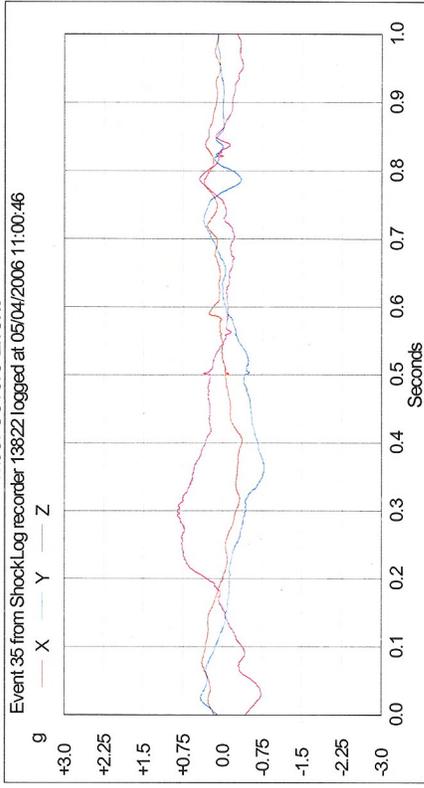
37 Events (37 Warnings, 0 Alarms)

Event	Axis	Date/time	Modulus (g)	Temp (°C)
First Warning	Z	04/04/2006 07:14:56	0.578	18.5
Most Severe	Z	05/04/2006 11:00:46	1.01	23.7

Summary of Peak Accelerations



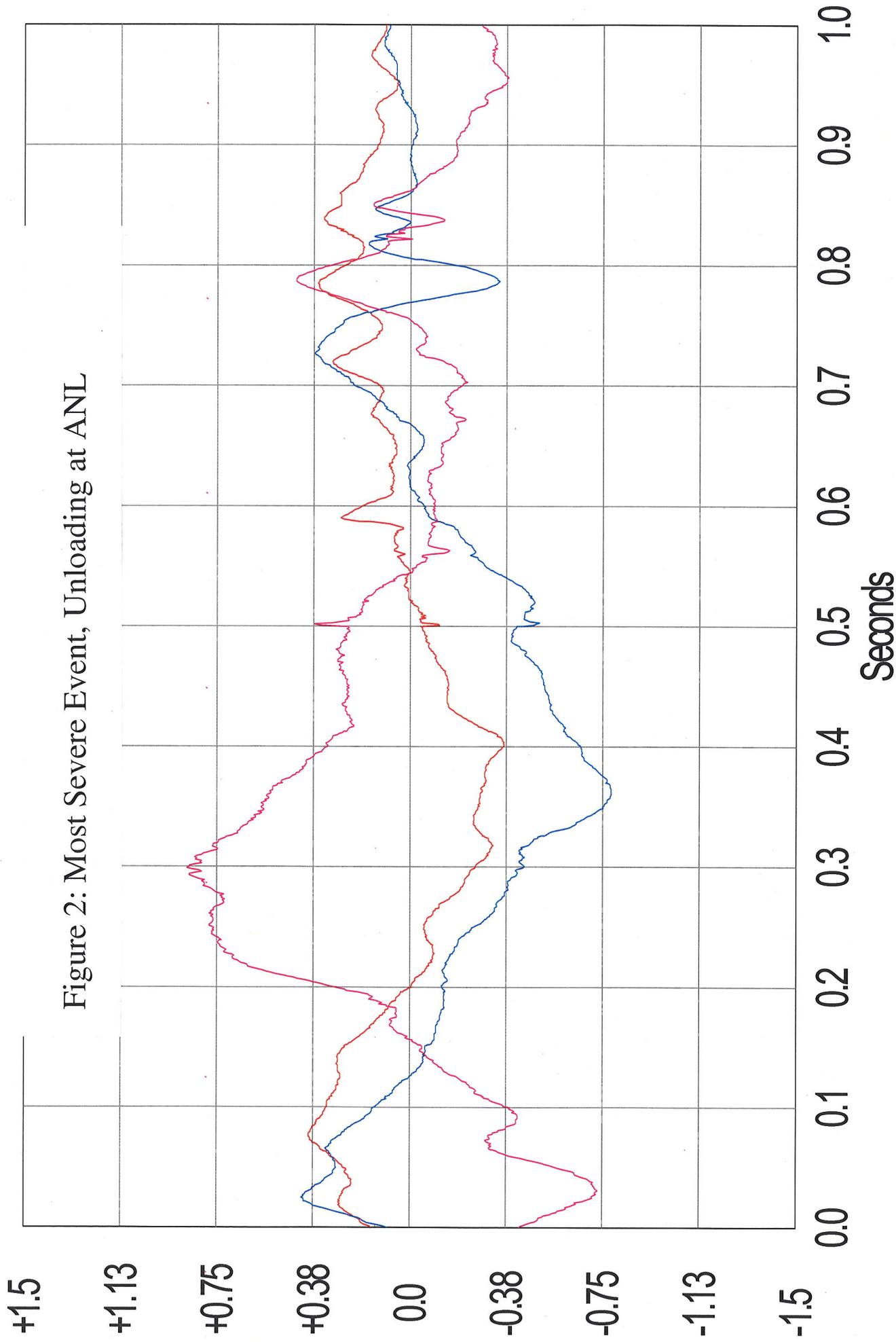
Most Severe Event



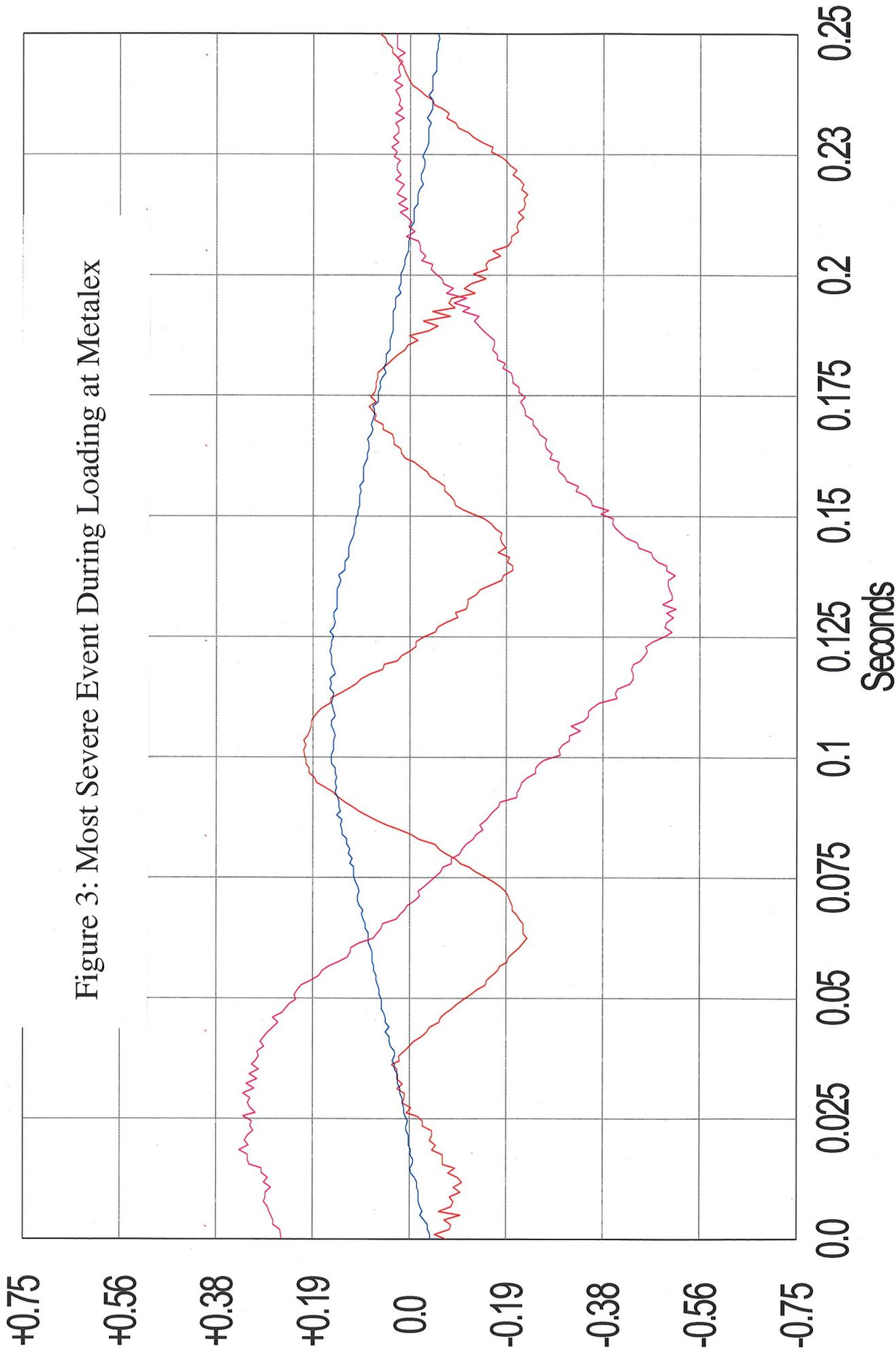
Setup Name	09MAR06 METALEX	
Start Date	04/04/2006 07:00:00	
Accelerometers	Event	Summaries
Range 3g	Record Length 16k	Interval 600s
Acc Wake 0.45g	Max Record Time	Total run time 364 days
Acc Warn X:0.75g	1s	Max no. of slots 52428
Y:0.75g Z:0.48g	Max no. of events	Channels:
Acc Alarm X:1.5g	100	max Pk X, max Pk Y,
Y:1.5g Z:0.99g	Not Always Max	max Pk Z, External
		Temp

Figure 1: ShockLog Monitor Summary Report

g — X — Y — Z



9 — X — Y — Z



9
+1.5
+1.13
+0.75
+0.38
0.0
-0.38
-0.75
-1.13
-1.5

