

November 4, 2008

## Acoustic Emission Source Location Experiment on a Carbon Fiber Woven Fabric Plate

### Experiment Setup

Four AE sensors with operation frequency between 100-400 kHz and resonance frequency at 200 kHz were mounted on a carbon fiber woven fabric plate with a distance of 600 mm between each sensor (see Figures 1 and 2). Four sensors with 60 dB preamplifiers were connected to the AE device. The coordinates of the sensors are given in Table 1. The carbon fiber plate is composed of carbon tows woven with a plain weave style pre-impregnated with B-staged epoxy resin (0.2 mm thickness per tow). The dimensions of the plate are 650 x 650 x 2 mm<sup>3</sup>.

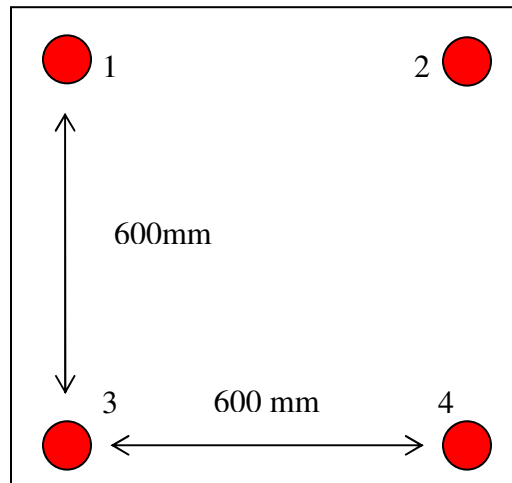


Figure 1. Diagram of the experiment.

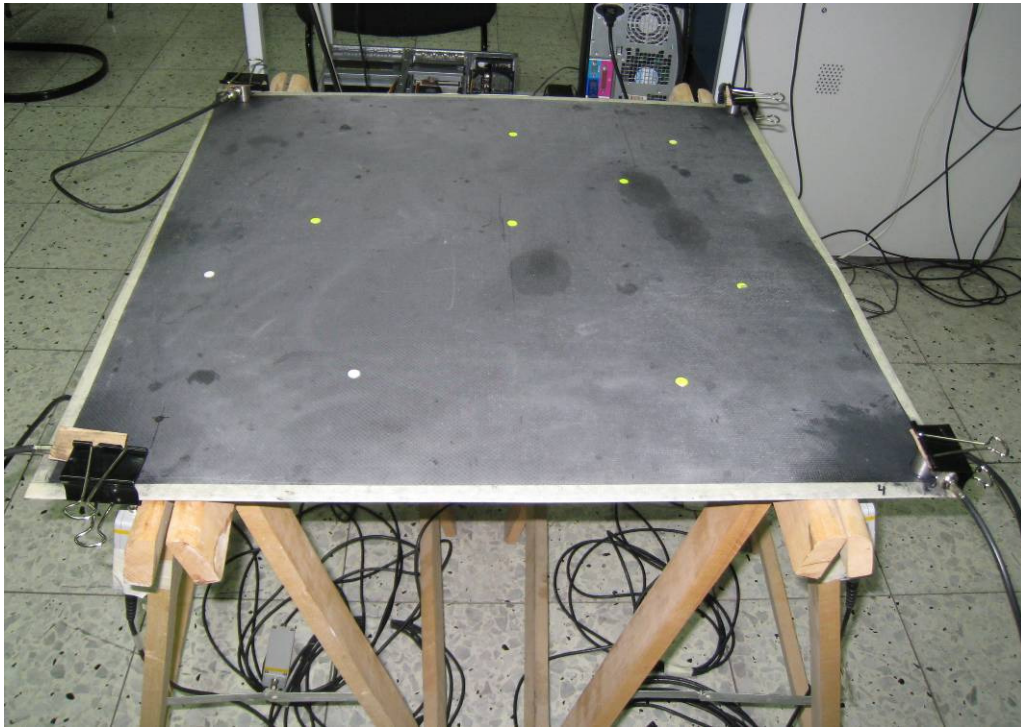


Figure 2. Picture of experiment setup.

Table 1. Sensors location coordinates.

	<b>X Coordinate (mm)</b>	<b>Y Coordinate (mm)</b>
Sensor 1	0	600
Sensor 2	600	600
Sensor 3	0	0
Sensor 4	600	0

## Hardware Setup

The hardware setup used for the experiments is shown in Table 2:

Table 2. Hardware Setup.

Threshold	<b>Analog Filter</b>		<b>Waveform Setup</b>		
	Lower	Upper	Sample Rate	Pre-Trigger	Waveform Length
30dB	100 kHz	2,000 kHz.	2MSPS	256 $\mu$ s	15K

## Experiment Procedure

Pencil lead break was used as a source of acoustic emission signals. Six lead breaks were initiated in 9 different locations and the waveforms were recorded on the AE device. The coordinates of the lead break sources are given in Table 3 and shown in Figure 3. For 3 sources a location was calculated using standard software of the AE device.

Table 3. Location of source coordinates.

	X Coordinate (mm)	Y Coordinate (mm)	Folder Name
Source 1	0	600	Location 0 600
Source 2	600	600	Location 600 600
Source 3	0	0	Location 0 0
Source 4	600	0	Location 600 0
Source 5	300	300	Location 300 300
Source 6	450	450	Location 450 450
Source 7	550	550	Location 550 550
Source 8	450	300	Location 450 300
Source 9	600	300	Location 600 300

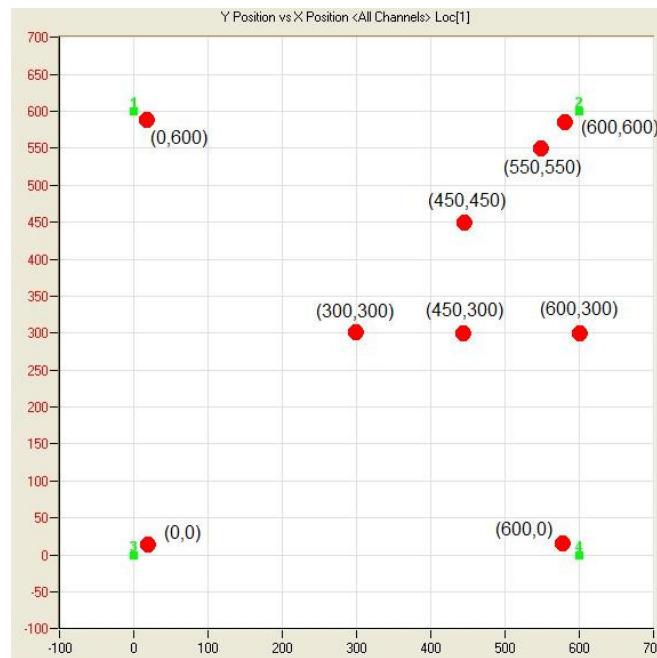


Figure 3: Location of the Sources.