Pressure Mat Set

for the LogIT Microsense® system

Instructions & Resources

Overview

The pressure mat set consists of two pressure mats which can be connected to a Microsense® compatable logger.

In Use

With software that offers timing facilities (such as Insight or LogIT Lab) you can use the pressure mats for triggering, counting and measuring time relationships between events. With non timing software or data logger display the sensor will be shown as counts per second (Hz) or as 1 and 0 (on/off).
The mats require a certain amount of pressure to trigger so some experimentation may be required to find the best performance.

Care

The mats are not waterproof and so care should be taken never to let any liquid or steam get into them. Care should be taken when placing the mats so as not to put them onto damp surfaces. Avoid using sharp objects with the mats as they could be damaged. Never disassemble the unit.

Safety

If using the mats on the floor to time races please make sure that they are secured to avoid them slipping when walked or run on. Either by placing light weight mats or carpet squares over them or tape them down.

Experiment ideas

The mats can be used to measure the speed that a person is travelling by setting the mats a known distance apart so that they are triggered as someone runs from one to the other.
If used in conjunction with a light gate or switch they can be used to time a falling object - it gives a larger target for the object to hit and also allows the use of larger objects such as footballs etc.
Another experiment idea would be to monitor what happens when you drop a bouncing ball - the time between bounces can be measured (a large ball such as a football is best for this).

Trouble shooting

If the sensor is not recognised by your software or datalogger, see www.logitworld.com
To upgrade the software click on the 'Support' tab and follow the on screen instructions.
To upgrade the datalogger, select the logger icon and then select 'Update' from the list on the left of the page. Note: Sensorlink, LogIT SL, LIVE and LogIT Black Box only require a software update and so do not have an 'update' option on their respective pages.

The resources shown overleaf are available in PDF form at www.logitworld.com

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"Time/Speed of a person"

Physics

Subject: Physics

Overview:
Measuring the speed of a person running can be very difficult with small light gates. Pressure mats enable the speed or time of a person to be found by triggering each mat as the person runs over the top of them. This simple procedure shows how the time of a person running around a track can easily be found.

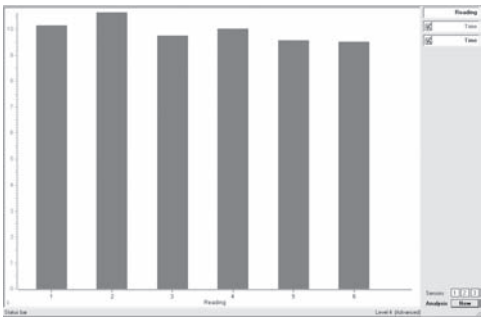
Equipment required: LogIT DataLogger
2 pressure mats
Protective carpet or similar
Computer
Thin ply Boards (used to provide a smooth surface to place the mats on if required)

Hazards:
If using the mats on the floor to time races make sure that they are secured to avoid them slipping when walked or run on either by placing light weight mats or carpet squares over them or tape them down.
Always check your local regulations or the school advisory service such as CLEAPSS or SSERC for guidance on the use of any hazardous material or source.

Suggested setup:
1. Connect the pressure mats to the datalogger.
2. Place the mats into a position such that they are triggered by the feet of the person. In the photo we have placed the mats side by side. The right one starts and the left one stops timing.
3. Connect the datalogger to the computer.
4. Start the timing software (see LogIT Lab or Insight manual) and select 'Time' from sensor 1 to 2.

Note: Connect the Pressure Mats to the datalogger in the order that they are to be activated. For example, put the first mat in channel 1 and the second mat in channel 2 (or indeed any channel higher than 1). Try not to place the mats too far apart or at an awkward distance such that the person may have to take more/less steps than is natural.
If using DataVision, select timing and setup the timing from sensor 1 to sensor 2.

Suggested method:
1. Start the timing software.
2. Start running and press the start mat (right) with the running shoe.
3. Run round the track and then press the stop mat (left) with the running shoe.
4. The time of the lap should be displayed.



Results:
From the time, the average speed can be calculated by dividing the distance run by the time taken.

Going further:
Was this an accurate test? If not why not?
What other tests could you perform on the runner?

"Braking distance of a bike"

Physics

Subject: Physics

Overview:

This experimental procedure is a simple way of measuring the speed of a bike (or large trolley) with a known wheelbase using a pair of pressure mats. The procedure can then be used to produce a braking distance versus speed graph.

Equipment required: LogIT DataLogger
2 Pressure mats
Carpet mats (to protect pressure mats)
Thin ply Boards (used to provide a smooth surface to place the mats if required)
Bike and pilot
Tape measure

Hazards:

It is suggested that the teacher or helper rides the bike.
If an exercise is being performed, make sure it is appropriate for the student and performed in a suitable location.
Always check your local regulations or the school advisory service such as CLEAPSS or SSERC for guidance on the use of any hazardous material or source.

Suggested setup:

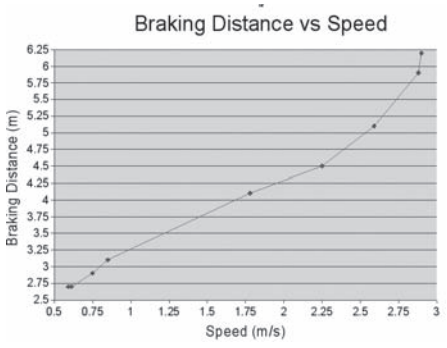
1. Measure the wheelbase of the bicycle. This can be done either where the wheels touch the ground or from the centre nut of each wheel.
2. Place the two mats a set distance apart eg. 1 metre.
3. Mark a line after the second mat which is longer than the wheelbase to make sure that the rear wheel has cleared the second mat. This line marks where the brakes need to be applied.
4. Connect the sensors to the datalogger and then connect to the computer.
5. Select timing from the datalogging software.

Note: Do make sure the mats are protected. Carpet tiles are a good idea.
Connect the mats to the datalogger and the datalogger to the computer.
Start the timing software (see LogIT Lab or Insight manual) and select 'Time' from sensor A to B.

Suggested Method:

1. Start the timing software.
2. Cycle over the two mats.
3. The speed of the bike is then recorded.
4. Apply the brakes of the bike when the marked line is reached.
5. Measure the distance travelled by the bike after this line.

Note: It does not matter when the rear wheels run over the mats as the software will ignore the second trigger of each mat and record one speed.



Results:

A graph can be plotted of braking distance against speed.
Students can predict what graph shape they should obtain.
Can you explain the shape?

Going further:

Was this an accurate test? If not why not?
What other tests could you perform using the bike and a running track?

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Waste electrical and electronic products must not be disposed of with household waste.
Please recycle where facilities exist.
Check with your Local Authority or Retailer for recycling advice.

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