

Laser Pointer Toolbox Talk

A toolbox talk on laser pointers and the risk to health and safety of employees, students and others in the University of Essex

Last updated June 2014

Toolbox plan

Toolbox aim: to increase audience knowledge on laser pointer hazards and dangers to them and others.

Desired Outcomes: Attendees will:

- Identify a laser pointer
- List how laser pointers can harm them and others
- Describe unsafe laser pointers and laser pointer behaviour
- List how to report unsafe pointers and/or behaviour in the University
- State where to go for emergency medical advice for laser injuries

Who should attend: anyone (employee, student, others) who may be exposed to laser pointer light as part of their duties.

Who delivers the toolbox: line managers/supervisors to their teams. It is not expected for staff to read this. It should be delivered to encourage discussion.

Pre-requisites: None

Resources: Copy of Health and Safety Bulletin [Health and Safety Risk: Laser Pointer](#)
Attendee signature sheet. (Must include attendees name, their signature, the date the toolbox was given and who gave it. Please keep a copy for your records and send a copy to HSAS as soon as the toolbox is completed.)
Appendix 1 – printed support information to allow attendees to see.

Programme: 20 minutes + 5 -10 for questions

What are laser pointers?

A laser pointer or laser pen is a small portable and visible laser designed to highlight something of interest by projecting a small bright spot of colored light on to it. They are usually portable, low powered, battery operated, hand held laser devices.

Laser pointers can be pen shaped, and these are the type usually marketed for professional use (figure 1). Devices intended for the novelty market can be of different shapes. These novelty laser pointers may also contain either interchangeable effects heads (figure 2) or have an integral selector control (figure 3). They are commonly supplied as key rings.

(Figure 1- 3 source: http://www.hpa.org.uk/web/HPAweb&HPAwebStandard/HPAweb_C/1195733794576)

In the University two very powerful lasers have been found and were used by the students to play games in halls (figure 4). They were shining the laser beam out of the halls down in to a communal area.

The laser in a laser pointer is a special form of light not found in nature. Only human technology can create a laser light beam. The light from a laser has properties that make it very powerful and it travels in a straight line.

You can only 'see' the laser because the light beam is scattered off dust, snow and rain and this light enters your eyes.

Laser pointers come in a range of colours:

- Red and orange
- Yellow
- Green
- Blue
- Violet

These colours correspond to the range of light that your eye is designed to see. However, your eye is ultra sensitive to green light and readily absorbs laser light in this colour. **HOWEVER ALL COLOURS CAN PRESENT A SERIOUS RISK TO PEOPLE EXPOSED.**

Support Information



Fig. 1



Fig. 2



Fig. 3

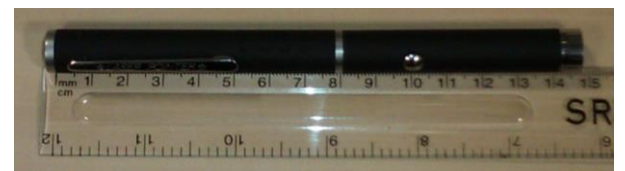


Fig. 4

Unsafe laser pointers and behaviour

- UNSAFE LASERS are greater than Class 2 that is greater than > 1mW output.
- DIFFICULT to determine laser class for cheap pointers, likely to be without labels or incorrect labels.
- ASSUME all lasers pointers are greater than class 2 and have enough energy to cause harm at reasonable distances.
- UNSAFE BEHAVIOUR is lasers pointers shone at University Employees or others either outside or inside buildings.

The University has a Standard on lasers that covers laser pointers. You can find it on the HSAS website under A-Z [Laser Local Rules](#).

Are all laser pointers unsafe?

No, laser pointers on sale through reputable suppliers in the UK and marked Class 1 or 2, under the current British Standard for lasers are low powered (< 1mW) and are generally safe to use, provided they are used with care and not deliberately stared at or shone into people's faces. Laser beams should never be pointed into anyone's eyes, either directly or via a reflective surface, as even low class lasers can cause eye damage.

Injuries from laser pointers

Laser pointers present two main dangers:

- retinal eye damage
- 'flash blindness'.

Retinal eye damage

If a laser pointer is shone directly into an eye the light energy can damage and burn spots onto the retina. Sometime vision improves, by it is more likely vision is permanently affected. Figure 5 is retinal injury in a teenage boy playing with a green laser pointer.

The black arrows show where the retina has been burnt and seriously damaged, seriously affecting the vision.

The laser beam was reflected off a mirror – so he wasn't even looking directly at it. The measured output of the device, which looked just like a low powered laser pen/pointer, was 150mW – a very powerful laser, but not uncommon.

IMPORTANT TO NOTE: In the University similar class laser pointers capable of causing similar eyes damage were being shone out of Harwich court down towards students and Patrol Staff. Both were cheap and bought in the UK. (figure 4). The devices were powerful enough to cause serious eye damage between **30 and 66 m away from the laser pointer and from the reflected beam**.

For more information see the bulletin.

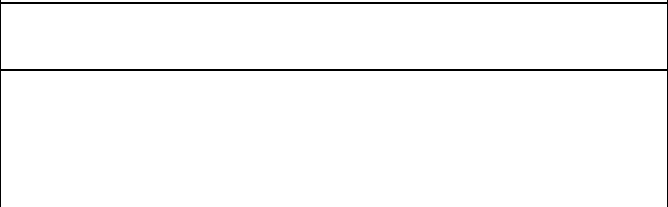


Fig. 5

(Source: <http://www.aurpo.org.uk/index.php/2012-01-10-20-18-25/general-news/55-laser-pointers>)

Flash blindness.

Flash blindness is visual impairment during and following

The beam is projected and can cause flash blindness.

<p>exposure to a light flash of extremely high intensity. It may last for a few seconds to a few minutes.</p> <p>Flash blindness is caused by bleaching (oversaturation) of the retina by light. As the retina returns to normal, so too does sight. In daylight the eye's pupil constricts, thus reducing the amount of light entering after a flash. At night, the dark-adapted pupil is wide open so flash blindness has a greater effect and lasts longer.</p> <p>Flash blindness is hazardous because it can dazzle pilots and vehicle drivers, making them unable to see whilst carrying out safety critical functions, like driving. This is extremely dangerous because it puts the driver, the passengers and others at risk.</p> <p>IMPORTANT TO NOTE: In the University similar class laser pointers were being shone out of Harwich court down towards students and Patrol Staff.</p> <p>The devices were powerful enough to cause flash blindness between 250m and 320m!</p>	<p>Symptoms of flash blindness:</p> <ul style="list-style-type: none"> • disrupted vision for seconds to minutes • bright spots in eyes, floaters • after images • hazy vision • feeling disorientated • reports of headaches • watery eyes or dry eyes • some people have reported migraine type symptoms.
<p>Reporting laser pointer incidents</p> <p>It is important to report laser pointer incidents to the Health and Safety Advisory Service.</p> <p>If you witness unsafe behaviour or have been exposed you must complete an Incident Report Form as soon as possible and return to the Health and Safety Advisory Service.</p> <p>Also, Patrol Officer Occurrence and Incident Reports and RSN reports must be sent to HSAS where laser pointer incidents have taken place. This must be done as soon as possible.</p>	<p>Why report?</p> <p>Joanna Carrington is the University's Non-Ionising Radiation Protection Adviser (UNIRPA) and she is a member of staff in the Health and Safety Advisory Service.</p> <p>She must be made aware of laser pointer incidents, even if it is believed no-one has been injured, to be investigated.</p> <p>Also, if specialist medical help is need this can be given in time.</p>
<p>Where to go for medical treatment</p> <p>Suspected eye injuries from laser pointers must receive medical treatment right away. Go to your GP as soon as possible for further advice.</p>	

Learning checks:	Answers
<ol style="list-style-type: none"> 1. What is laser pointer? 2. List how laser pointers can harm you and others 3. Describe unsafe laser pointers and laser pointer behaviour 4. List how to report unsafe pointers and/or behaviour in the University 5. State where to go for emergency medical advice for laser injuries 	<ol style="list-style-type: none"> 1. A <u>laser pointer</u> or <u>laser pen</u> is a small portable and visible laser designed to highlight something of interest 2. Can damage your retina (affecting your vision permanently) or cause flash blindness (affecting ability to carry out driving or <i>safety critical functions</i>) 3. Difficult to identify unsafe lasers pointers – they all could be potentially dangerous. Labels can be misleading. Dangerous laser pointer behavior is shining it a people inside or outside. 4. University H&S Incident Form (plus offence reports, occurrence reports, RSN reports). Fwd any reported laser pointer activity to the HSAS. 5. Seek medical advice as soon as possible by going to your GP.