

Hi Guys

Just a few words on combating speed traps and possible defences against them. The digital photo below is one sent to me to get me to “confess” to speeding. I didn’t. I used the services of this guy, Ian O’Grady at <http://justiceforeveryone.co.uk> and at date of writing I am waiting for an outcome but I did leave it very late.

However there are other things I can do to throw doubt on the “evidence” so let’s consider the “evidence” from a practical point of view. Take a really close look at the picture and write down what you actually see.

Notice No.:

Registration No.:

Speed: 36 MPH

Location: A496 Ynys, Gwynedd / Both



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First, to avoid accusations of tampering, I need to tell you what has been done to this specific picture before it was published here. Obviously the vehicle number has been removed and also the original copyright notice has been moved to just under the picture (strictly speaking it is MY copyright since the photo was scanned by myself and modified by myself and is no longer the original photo which is why I am detailing the alterations). I have also removed the notice number and the registration number.

So starting at the top of the picture, what do we see?

- 1) A printout giving details of: Time, 13:34:47, A frame reference number, nr35, A videotape reference: 91335877, An alleged speed reading: * 036 MPH, A Date: 10-08-07, and a distance, 0114.6 Metres. This is superimposed over,
- 2) A photo of a car and caravan at a place impossible to identify from the photo.

- 3) The windscreen is a blur making it impossible to identify the occupants, or even number of occupants, of the vehicle
- 4) In the lower third of the photo positioned on the vehicle there is a set of cross hairs showing the supposed position of the aim point of the detection beam on the vehicle and a log number: log: 040
- 5) On the underside of the vehicle are two faint red marks. The mark on the left is aligned with the horizontal cross hairs and the one on the right aligns with the vertical cross hair.
- 6) The right hand cross hair is partly obscured by the log number and the lower vertical cross hair is missing due to the low aim point of the beam.

OK very clever, what does it tell us and how can we use it?

Well point one tells us that since the frame rate (the speed the video takes individual pictures at) will be either 27 frames per second (American ntsc system), or, 25 frames per second (UK and large parts of Europe pal system) and since the sampling rate of the detector, a LTI 20/20, is 33 times per second then the video and sample rate are not in sync so no matter what claims are made the picture is NOT, as claimed by the police, a picture of the vehicle travelling at 36 MPH at the time the picture was taken. This is critical since the police and Home Office, who licence these detectors, claim infallible accuracy but they can not actually match the picture to the speed.

Next, if it is not possible to accurately identify the point where the alleged offence took place, how can anyone guarantee who was driving.

Point three is that with no photographic evidence there can never be any certainty as to who was driving.

Now for a really good bit. Number four shows quite plainly that the aim point is on the underside of the vehicle. Because of all the lumps and bumps on the underside this area is specifically prohibited as an aim point. An explanation is given below.

Number five shows two faint marks. Both aligned to different parts of the sighting mechanism for the detector (the horizontal and vertical cross hairs) and shows two pulses of the laser beam and two different aim points. Since neither is in the centre of the cross hairs this means the device is not calibrated correctly as, unlike a bullet, a laser beam does not drop in flight.

Six confirms the low aim point which renders the reading inaccurate.

Not bad for simply looking at a picture! However with the law and lawyers it's as well to adopt a belt and braces approach so let's put in a few more points.

In point four I said an explanation for not aiming at the underside of a vehicle would be given, so here it is. There is a phenomenon known as "creep" and this is simply that the laser device is so accurate that even a slight tremor in the hand of the operator can move the aim point of the beam between points on the vehicle which are either further from, or nearer to the measuring device.

This is vital because despite any claims a laser beam does not directly measure speed. What it does is measure, extremely accurately, the time it takes from the pulse being sent to the reflection of the pulse being detected. Since the speed of light is known this means that a little bit of arithmetic tells you the distance that the object which reflected the beam is, is from the source of the beam. If you then fire a second pulse you get another distance reading and a little more arithmetic tells you how far the reflecting surface has moved towards or away from the source of the pulses. This lets you work out how fast the reflecting surface is approaching or receding from the source of the pulses.

Just stop there and work out how far your car travels in $1/33^{\text{rd}}$ of a second because it is this distance which will give your speed reading and if the pulses are directed at, for example the bottom of the front bumper and the rear spring you will have several feet to play with. Mind you that way round you will be reading slower, just believe me it's a lot easier, but if the next pulse is on the front number plate you will be reading the same amount faster. The easiest way is to work out how far a difference of 1MPH makes and the formula is: 1760 yards to a mile x 36 inches to a yard = 63360 inches per hour. Inches per second means divide by 3600 (seconds in an hour) = 17.6

inches per second. So to get the distance between the two pulses needed to calculate your speed divide by 33 = 0.53333 inches per pulse.

So what?

Well in the photo above the speed is given as 36 mph and is shown as the last frame in a series of 35 (remember the frame number?) and you get an allowance of 10% for speedometer error or driver error in reading the speedometer. So that means that the police will not prosecute until 34mph or above. They will also add a bugger factor of whatever the local police authority has guessed at as reasonable. In this case I would guess at 2mph taking this up to 35mph and the camera and auto print out set to record anything above that. So let's look at the picture again and we can see two possible aim points both off of the official target area (the number plate) and both on a part of the vehicle which recedes sharply away from the pulse generator. If the cross hairs are extended to form an actual intersection it is under the front bumper of the vehicle. As the lower of the two marks is the fainter it is reasonable to assume that this is the earlier pulse still being recorded as a residual signal on the charge coupled device in the camera and that the brighter mark is the later pulse. This leads to the conclusion that as the distance involved on the vehicle is more than 0.5333 of an inch the target area has moved and the speed has been artificially increased by several mph.

This need not be down to bad practice on the part of the officer operating the device but simply because the damn things are so accurate, but it does illustrate that there is definite room for error. This is in fact accepted and police guidelines for operating these devices state that it must be held rigidly and if possible braced against a solid object.

This in turn leads to the problem that if the object in the sights is moving, the sights and therefore the recording device must be moved to retain the target in the sights and this is a direct violation of operating guidelines. The next problem with the operating guidelines is in the bracing against a solid object. I know that the picture above was taken from a parked van, this is certified by the police constables statement, and since I spent several years fitting access platforms, that's cherry pickers to you, I know how much effort goes in to stabilising a parked van since the suspension can cause several feet of sway at the full extension of the platform boom. Now our man on the LTI 20/20 was not 10 or 15 metres up in the air but the type of vehicle with the LTI 20/20 mounted in it has no hydraulic stabilising jacks and simply shifting in your seat can cause a parked car to rock so unless the constable has developed the ability to remain rigid for the entire length of his shift, he, and consequently the van his LTI 20/20 was mounted in were moving. Since the distance recorded is 114.6 metres it only takes a millimetre of movement to screw up the aim point of the LTI 20/20 and so the speed reading becomes inaccurate and therefore invalid.

So much for the photo, which incidentally is digital and if YOU or I produce a digital photo the judge will rule it inadmissible due to ease of alteration. Let's move on to geometry and see what we can work out to assist the large body of error we already have.

Remember that since my target speed is 33mph I am only looking for 1.59999 inches error to reduce me to a legal speed, but, since I'm feeling generous I'll make it 2 inches.

We need to go back to school for the next bit. Do you remember sitting in the geometry class wishing the teacher would stop bleating on about right angle triangles? Maybe you should have listened.

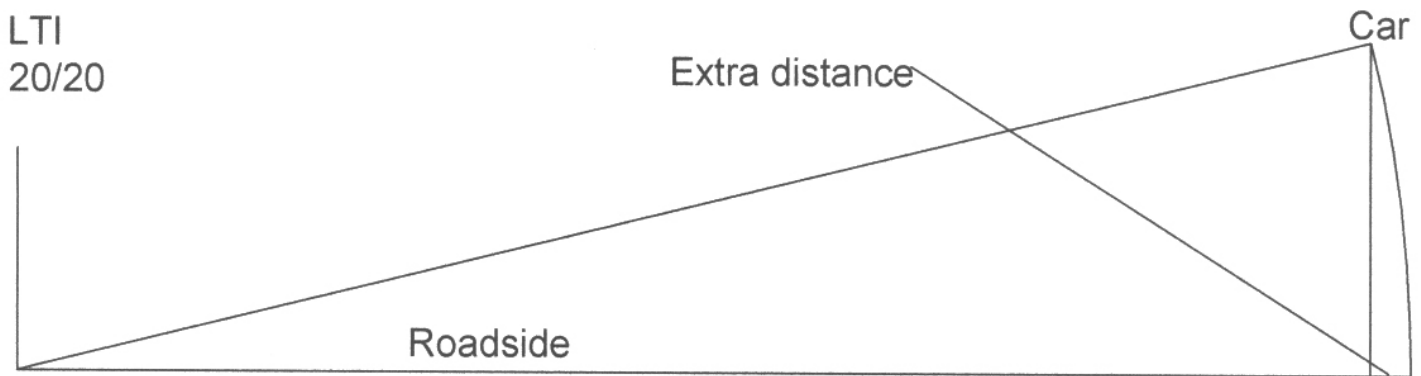
All the stuff above about measuring the distance twice, working out the difference and then the speed has a basic flaw built into it when checking cars. The device the LTI 20/20 was based on, and the LTI 20/20 itself, assume that the object having its distance calculated is directly in front of the measuring device.

What difference will that make?

Well if you look at a geometry set and the triangles that are a part of it you will see that the 30-60-90degree triangle has two short and one long side. If you imagine the LTI 20/20 being at the narrow point and your car at the point opposite it on the longest side and a straight bit of road being the second longest side you will begin to see what I mean. The LTI 20/20 assumes it is looking down the second longest bit because it has no way of telling that it is actually set off to one side. It has to assume that you are heading straight for it. No one can programme in how far out (the shortest side) your car is until you have the LTI 20/20 focused on your front number plate and even then there is room for error so this difference, from the LTI 20/20 at the side of the road to the mid point of your car, is ignored. I have no idea how far off of 90degrees from the LTI 20/20 the car in the picture is. The officer making the recording has no idea.

So how does that affect the speed reading?

Have a look at the diagram below, just remember that it's not to scale or you would not be able to see the difference. Since I worked out the speed in inches I need to convert 114.6 metres to inches and then assume a distance in inches from the LTI 20/20 to the centre of the number plate. For simplicity I used 10 feet. Then I need to work out the actual distance by finding the square of both these lengths and subtracting the smallest from the largest then finding the square root of that number. This is because the sum of the squares of the shortest two sides are equal to the square of the longest side. This will not be a lot but I only need 2 inches. In fact with the other inaccuracies already pointed out this is really only showing up how riddled with errors the system is. Since I assumed 120 inches (10 feet) for the short leg the actual distance is 1.5962 inches not the two inches I was looking for but almost exactly on the 1.59999 needed to reduce the speed to an allowable 33mph. So along with the other errors already detailed the car is certainly below the speed limit. This is not a guess or estimate it is a definite and reproducible set of facts leading to a firm conclusion.



Anything else we can do to create doubt?

Well the pitching motion of a car towing a caravan makes it impossible to accurately focus on the number plate since it is constantly moving up and down. So either the LTI 20/20 needs to be moved to match it (against official guidelines for use) or the reading will be out and so inadmissible as evidence. Also, as already stated, the movement of the car towards the LTI 20/20 means that the LTI 20/20 will have to be continuously tilted down to keep the beam focused on the same spot. Once again contrary to official guidelines.

Now what about the other 34 previous frames? I have not seen them and are there other frames AFTER frame 35? If frame 34 shows a speed of 29 mph then the vehicle in question has an acceleration slightly better than the space shuttle and if frame 36 shows 30mph the brakes are the best in the world and the drivers reaction time is better than a jet fighter pilot. So now we know that the police are being economic with the evidence. It is also safe to assume that the alleged speed of 36mph is the maximum recorded speed since the police would certainly have gone for the maximum speed achieved for greater impact in court.

OK sorry this was so long but it needs to be looked at as a whole rather than a series of disjointed facts.

SO, ARE YOU STILL HAPPY TO PAY THE FIXED PENALTY?

Regards

stainless_steel_rat@hotmail.com