

Beware – Wigwags Ahead!



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Though they may seem like relics of a bygone age, there are still over 9000 level crossings in use in Britain and just shy of 1,000 in Ireland today. Together, they represent a significant safety hazard. Between 2003 and 2004, 33 people in Britain were killed in accidents at level crossings. Half of those were suicides. The rest were split evenly between motorists and pedestrians. In Ireland, in 2019, there were 155 incidents at level crossings. Almost 300 people die at level crossings each year and level crossing incidents account for 1pc of road deaths in Europe, but 31pc of all road fatalities. This paper looks at the history of Wigwags, its involvement in the American Civil War and examines the terms Ear-wigging and Finger-wagging. It looks at the various types of level crossings and the use of Wigwags in emergency vehicles. Did you know that some level crossings are still manually operated, and require you to get out of your vehicle, open the entry gate, then the exit gate on the other side, drive your vehicle through, then get out and close both gates again before driving off? No? Then read on.

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*Wigwag - "To send a signal by or as if by flag or light waved according to a code".*¹

The history of level crossings depends on the location, but often early level crossings had a flagman in a nearby booth that would, on the approach of a train, wave a red flag or lantern to stop all traffic and clear the tracks. Gated crossings became commonplace in many areas, as they protected the railway from people trespassing and livestock, and they protected the users of the crossing when closed by the signalman/gateman. In the second quarter of the 20th century, manual or electrical closable gates that barricaded the roadway started to be introduced, intended to be a complete barrier against intrusion of any road traffic onto the railway. Automatic crossings are now commonplace in many countries as motor vehicles replaced horse-drawn vehicles and the need for animal protection diminished with time. Full, half or no barrier crossings superseded gated crossings, although crossings of older types can still be found in places. In rural regions with sparse traffic, the least expensive type of level crossing to operate is one without flagmen or gates, with only a warning sign posted. This type has been common across North America and in many developing countries. Some international rules have helped to harmonize level crossings. For instance, the 1968 Vienna Convention states (chapter 3, article 23b) that:

- "One or two blinking red light indicates a car should stop; if they are yellow the car can pass with caution".
- Article 27 suggests stop lines at level crossings.
- Article 33, 34, 35 and 36 are specific to level crossings, because level crossings are recognized as dangerous.
- Article 35 indicates a cross should exist when there is no barrier or lights.
- This has been implemented in many countries, including countries which are not part of the Vienna Convention.²

¹ merriamwebster.com

² Level Crossings. en.wikipedia.org

During a recent conversation with a friend and colleague (no names mentioned) - who incidentally is regarded as a top class driver/driver trainer and who possesses all the industry driving and training qualifications - the word 'Wigwag' came up. Based on the conversation I decided to 'look into' and write about these important warning devices located at level crossings, at other places and also used by emergency vehicles. Wigwag – not to be confused with the term Wigwam - an Indian tepee - is a nickname given to a type railroad grade crossing signal once common in North America named for the pendulum like motion and used to signal the approach of a train. It is generally credited to Albert Hunt, a mechanical engineer at Southern California's Pacific Electric Interurban Streetcar Railroad who invented it in 1909 for safer railroad grade crossings. The term should not be confused with its usage in Britain where Wigwags are alternate flashing lights such as those found at modern level crossings.³ First, let's look at the term wig and then the term wag and see how they originated and where we may have experienced them in the past. Many of us as kids were given an ear-wigging from our parents if we did something wrong. Also, when at school it was common practice to get an ear-wigging from the teacher if he/she considered it necessary to chastise an unruly pupil. However, that practice wouldn't be allowed today. Wagging on the other hand was used to scold or harangue For example, a finger-wagging or a tongue-wagging is used to scold or berate someone.

Back & Forth Movements

During the American Civil War (1861-1865), messages were sent using flags, winking lights and rockets. The signal system, an American device was first tested in border warfare against the hostile Navajo Indians'; afterwards the quick-witted soldiers of both the Federal and Confederate armies developed portable signalling to great advantage.⁴ The oldest flag system associated with the US Army Signal Corps is called Wigwag. The name reflects the concept of back and forth movements as a means of signalling through motion. The signalling system was developed for military field operations by Army surgeon Albert, J. Myer prior to the Civil War. He developed this system based on a two-element "tap-code" he created for the deaf. Myer's flag system used one flag for signalling. The position of the flag, left, right and front represented the numerals 1, 2 and 3 respectively and combinations of these numerals were used to convey the message.⁵

³ *Definitions & Translations*. definitions.net

⁴ *The Signal Corps*. A.W. Greely. Maj. General, US Army 1860-1865. civilwarsignals.org

⁵ The Wigwag Civil War. civilwarsignals.org

Ear-wigging - Coined in Parliament?

Ear-wigging is said to come from the old wives' tale, that an earwig could burrow into a person's head via the ear and poison the brain. However improbable that may be seen, there is certainly support for the view that the term was coined in the UK Parliament for the practice whereby members of the governing party would approach the chamber behind the Speaker's chair and as they passed by would whisper into the Speaker's ear. Until the present Speaker, incumbents used to wear a full bottomed wig rather like judges so it was necessary to raise the corner of the wig to expose the ear, hence the term ear-wigging. It also appears that the term ear-wigging is meant to "annoy or attempt to influence by private talk". Further, it is a legal term unique to the US state of Mississippi. Under state law the practice of ear-wigging - a term intended to prevent an attorney from discussing the facts of a case outside of formal legal proceedings - has come to mean improper *ex parte* communication prohibited by Mississippi Chancery Court rules.⁶

Finger-wagging- a Sign of Anger

The origin of finger-wagging dates back to Pagan Rome when priests used it to express erotic temptation. When the country embraced Christianity as its religion, the finger-wag was termed. The expression of "wagging thine finger" was also banned and punishable by death during the middle ages. It wasn't until the Enlightenment that finger-wagging returned to legality. Although people didn't know what finger-wagging meant, it was associated as a sign of anger since people before died for doing it. Over time, the finger-wags meaning slowly waned until it only signified slight anger.⁷ Wigwag signals are traffic signals consisting of a set of three lamps mounted on a rectangular board, with an upper pair of horizontally aligned red lamps which flash alternatively when in operation. These lights stay on for the duration of the closure of the track. The lower lamp is normally amber and comes on about three to five seconds before the red lamps begin to flash. This light (amber) is used in a similar fashion to the amber light on standard signal heads, warning that a red signal is about to be lit and that approaching vehicles should stop – provided they can do so safely. The boards on which the lamps are mounted are invariably black and have a red and white chequered surrounding, although a narrow white plain edge is occasionally used. The most common use of wigwags is to protect level crossing. However, as previously mentioned, they are also used widely to warn of open bridges and vehicles emerging from fire stations as well as in a range of other situations, where the road ahead may be blocked at random times.

⁶ Charles Holloway. 1 November 2011. *Ear-wigging*. charlesholloway.co.uk

⁷ Wag of the finger. Wikialty.com

More regular blockages such as occasioned by cattle being taken for milking have simpler warning lights. The advance warning of a Wigwag signal sign – colloquially known as a – ‘stop when light shows’ – is a supplementary plate used to indicate the presence of Wigwag signals at either a level crossing, swing or lifting bridge, airfield, tunnel, an emergency service station or other place where traffic has to stop infrequently. .8

Many Types of Crossings

A level crossing is where a railway line is crossed by a road or right of way without the use of a tunnel or bridge. Currently, there are almost 9,000 level crossings in Great Britain. Over 7,000 are managed by Network Rail. The rest are located on heritage railways, metro systems or industrial railways. A level crossing is an at-grade crossing between a road and a railway. As of May 2006, there were 7,674 such crossings in the UK, though a large number are for pedestrians only. These crossings 1,623 have some form of control (barriers or signals). Because of the dangers associated with level crossings, no new level crossings are to be constructed in the UK other than in exceptional circumstances. There are many types of crossings: manually controlled gates; manually controlled barriers; automatic half barriers; automatic open crossings and open crossings. Other types of crossings may be restricted in who can use them. These usually involve the user opening and closing the gates or barriers themselves. Sometimes miniature warning lights are installed to advise when it’s safe to cross. In other situations the user must telephone the signal box to get permission to cross the line. Instances of this could be very heavy long slow moving vehicles or herds of cattle.

Passive or Active Protection

Trains have a much larger mass relative to their braking capability, and thus a far longer braking distance than road vehicles. With rare exceptions, trains do not stop at level crossings and rely on vehicles and pedestrians to clear the tracks in advance. Level crossings constitute a significant safety concern internationally. On average, each year around 400 people in the European Union ⁹ and over 300 in the United States ¹⁰ are killed in level crossing accidents.

⁸ Warning signals/ Advance warning of Wigwag signals. sabre-roads.org.uk

⁹ Cirovic, G.; Pamucar, D. (2012). "Decision support model for prioritizing railway level crossings for safety improvements: Application of the adaptive neuro-fuzzy system". *Expert Systems with Applications*. **40** (6): 2208–2223. [doi:10.1016/j.eswa.2012.10.041](https://doi.org/10.1016/j.eswa.2012.10.041)

¹⁰ ^ Mok, Shannon C; Savage, Ian (1 August 2005). "Why Has Safety Improved at Rail-Highway Grade Crossings?" (PDF). *Risk Analysis*. **25** (4): 867–881. [doi:10.1111/j.1539-6924.2005.00642.x](https://doi.org/10.1111/j.1539-6924.2005.00642.x). PMID 16268935. S2CID 5744697.

Collisions can occur with vehicles as well as pedestrians; pedestrian collisions are more likely to result in a fatality. ¹¹ Among pedestrians, young people (5–19 years), older people (60 years and over) and males are considered to be high risk users. ¹² As far as warning systems for road users are concerned, level crossings either have "passive" protection, in the form of various types of warning signs, or "active" protection, using automatic warning devices such as flashing lights, warning sounds, and barriers or gates. In the 19th century and for much of the 20th, a written sign warning "Stop, look, and listen" (or similar wording) was the sole protection at most level crossings. Today, active protection is widely available, and fewer collisions take place at level crossings with active warning systems. ¹³ Modern radar sensor systems can detect if level crossings are free of obstructions as trains approach. These improve safety by not lowering crossing barriers that may trap vehicles or pedestrians on the tracks, while signaling trains to brake until the obstruction clears (however, they cannot prevent a vehicle from moving out onto the track once it's far too late for the locomotive to slow even slightly). ¹⁴

Wigwags & Emergency Vehicles

A Wigwag device incorporated in vehicles headlights, flash at a pre-set rate. In its traditional form, a Wigwag constitutes the illuminating of the right and left headlamps alternatively for around half-a-second at a time. In Ireland, as in the UK, the Wigwag is only seen on the road or emergency vehicles. Some of those vehicles include: police, ambulance, fire tenders, vehicles used for disposal of bombs or explosives, mountain rescue, blood transfusion, Secretary of State for Defence and the Royal National Lifeboat Institution etc. Although the use of Wigwag lights does increase the visibility of any vehicle, it can also create problems. In situations when full-beam headlights are flashing, the Wigwag may create glare or otherwise temporarily blind the drivers of oncoming vehicles. Generally, Wigwags are prohibited on all vehicles except emergency vehicles. ¹⁵

¹¹ [^](#) Australian Transport Safety Bureau (2004). "*Level crossing accident fatalities*" Check |url= value (help). ^{!permanent dead link!}

¹² [^](#) Lloyd's Register Rail (2007). "*Study of pedestrian behaviour at public railway crossings*". Public Transport Safety Victoria.

¹³ [^](#) Federal Railroad Administration (2006). "*Railroad safety statistics: 2005 annual report*". Federal Railroad Administration, Washington D.C.

¹⁴ [^](#) "*Honeywell Radar Scanner, Advantages & Benefits*" (PDF). Honeywell Regelsysteme GmbH. 11 May 2012. Retrieved 1 September 2013.

¹⁵ en.wikipaedia.org

No Unified Control

Part of the problem with level crossings is that there is a bewildering variety of them, and very little standardisation. A vast multiplicity of authorities, executives, local councils, and private businesses share responsibility for operating and maintaining them. There is no unified control. You may have a vision, or even experience, of a modern level crossing system - a technological marvel where an automated barrier system ascends and descends in perfect synchrony with the approaching and departing trains, posing no danger to anyone and wasting little time. But not all level crossings are like that. The Health & Safety Executive has recognised the hazardous nature of level crossings by declaring that, other than in exceptional circumstances, no new level crossings will be built in Britain. The problem of intersecting rail and road routes would simply be solved in another way today; but retrofitting level crossings across the length and breadth of Britain would be a vastly expensive undertaking so these quaint features of the British road system will probably be with us for some time to come.

Level-Crossing Incidents

Getting comfortable with the way level crossings operate could save your life some day. The danger is particularly acute when travelling on an unfamiliar route, perhaps making a daytime trip with your family to visit an old castle in the countryside. You come across a level crossing unlike any you've ever seen before. Perhaps there is no barrier. There may be a phone next to the roadside. What do you do? Statistics show that the number of non-passenger public fatalities on railways in Great Britain from 2001-2009 were pedestrians. Trespassing was consistently the main cause of death among members of the public (not passengers) who were killed on the rail network in GB of which 22 were trespassing at the time.¹⁶ Between 2005 and 2019, the highest risk for passenger trains arose from potential collisions with vehicles at level crossings.¹⁷ According to a report (undated) by the Office of Rail Regulation, the incidence of reported near miss and crossing misuse is steadily increasing. In 2005, there were over 1,000 incidents of misuse involving vehicles, 179 near misses and almost 1,400 misuse and 244 incidents involving pedestrians. In Ireland, there are just than 1,000 unattended level crossings in the Irish Rail network. On the network, there were 155 incidents at level crossings in 2019, according to Irish rail. Incidents included near-misses with cars, tractors, cyclists, pedestrians and vehicles striking barriers and vehicles abandoned on a level crossing.¹⁸

¹⁶ Statista. [statista.com](https://www.statista.com)

¹⁷ Statista. [statista.com](https://www.statista.com)

¹⁸ Irish Times. June 2017. [irishtimes.com](https://www.irishtimes.com)

If you break down or are involved in an accident on a level crossing, the first thing you should do is ensure all passengers get out of the car and move safely away from the crossing. Next, inform the signal operator of the issue by using the trackside telephone at the crossing and follow any instructions given. If there is no phone, call the emergency services and tell them what has happened. If possible, move the vehicle clear of the crossing if there is time before the next train arrives but remember – if at any time the sirens sound or warning lights come on, leave the vehicle and immediately get to safety away from the crossing.

Conclusion

“Wigwag” was the nickname given to a type of crossing signals once common in North America, named for the pendulum-like motion it used to signal the approach of a train. Albert Hunt, a mechanical engineer at Southern California's Pacific Electric (PE) interurban streetcar railroad, invented it in 1909 for safer railroad level crossings. He utilized alternating electromagnets pulling on an iron armature. A red steel target disc, slightly less than two feet in diameter was attached and served as a pendulum was attached. A red light in the centre of the target illuminated, and with each swing of the target a mechanical gong sounded. The new model, combining sight, motion and sound was dubbed the "Magnetic Flagman" and produced by the Magnetic Signal Company. First developed in concept by the Stanford Research Institute in the late 1950s at the request of the Southern Pacific Company and patented in 1966, the design goal of the level crossing predictor was to provide a consistent warning time for trains approaching a level crossing. Wig-wag signals are traffic signals consisting of a set of three lamps mounted on a rectangular board, with an upper pair of horizontally aligned red lamps which flash alternately ('wigwag') when in operation. The lower lamp is amber. They are used for a variety of purposes, including the protection of level crossings, lifting or swing bridges, and the exits from fire stations. It is an offence to pass a stop line guarded by the flashing red signals. Backing boards on which the lamps are mounted are invariably black, and normally have a red and white chequer surround, although a narrow plain white edge is occasionally used. The most common use of wigwag signals is to protect level crossings. However, as mentioned above, they are also used widely to warn of opening bridges and of vehicles emerging from fire stations as well as in a range of other situations where the road ahead may be blocked at random times of day. More regular blockages, such as those occasioned by cattle being taken for milking have simpler warning lights. In addition to the two, alternately flashing, red lamps at the top of the board, there is also normally a single amber lamp lower down. This is used in a similar fashion to the amber light on standard signal heads, warning that the red signal is about to be lit and that approaching vehicles should stop if they can do so.

You may have a vision, or even experience, of a modern level crossing system - a technological marvel where an automated barrier system ascends and descends in perfect synchrony with the approaching and departing trains, posing no danger to anyone and wasting little time. But not all level crossings are like that. There are the unprotected ones. Finally, when approaching Wigwags beware of fast approaching trains and be prepared to stop if necessary. Take note of any warnings signs/signals on the approach – especially “Puffin Billy” and you should be able safely negotiate the Wigwag without any undue concern and reach the other side unscathed.