



Isambard Kingdom Brunel's iconic Clifton Suspension Bridge carries the B3124 over the River Avon Gorge and river. Abnormal load management is outsourced to Cascade Software by Bristol City Council. Abnormal loads are not permitted to cross the bridge, and there are 4 tonne weight and 2.5m width limits.

White paper

How to manage and check Abnormal Load Notifications

An updated 2022 overview of the notification process and the options currently available to Structure Owning Authorities.

John Waterfall MA FICE MCIHT
Chairman, Cascade Software Limited

This white paper covers the following topics:

- | | | | |
|---|---|---|--|
| 1 | The STGO | 2 | Why it is important for Structure Owning Authorities to check abnormal load notifications properly |
| 3 | Abnormal load management and checking systems | 4 | How well are structures really checked? |
| 5 | Summary | 6 | Structure owning authorities already using Cascade Software |



The STGO - 'The Road Vehicles (Authorisation of Special Types) (General) Order 2003'

The STGO Regulations provides the legal framework for the abnormal loads notification process.

Although updated in 2003, the process of abnormal load notifications as set out in the STGO has remained largely unchanged since the 1960's, providing the framework for abnormal load notifications by hauliers and plant operators to Structure Owning Authorities (SOAs) and Police Authorities (PAs).

The STGO requires all abnormal load hauliers and plant operators to notify Structure Owning and Police Authorities in advance of moving abnormal load vehicles. Very generally, for Structure Owning Authorities (SOAs) an abnormal load vehicle will have a gross weight exceeding 44 tonnes or will be seriously wide or long. Because of their closely spaced heavily loaded axles, all mobile cranes are also classed as abnormal loads.

In early years these notifications were made by telex or letter, then moving on to fax, and for the last 20 years or so to email and online. More recently, some authorities have attempted to dictate – 'mandate' – the format and means of transmission of notifications, although whether the STGO allows this is not at all clear. It states that 'The notice must be in a form acceptable to the authority ... and should be agreed by both parties'. Furthermore, the government's own 2018 Special Types Enforcement Guide (Section 9 – Documentation) states positively 'There's no set format for notifying the police, highways and bridge authorities'.

The STGO notification process provides SOAs with an opportunity to check the passage of each abnormal load across their structures, and to respond to hauliers when they believe that notified vehicles cannot cross safely. The process exists to protect the integrity and prolong the life of structural assets. Sometimes SOAs forget this!

The STGO also gives Police Authorities (PAs) the opportunity to check notifications and advise hauliers if the notified vehicles are likely to cause unacceptable traffic management issues.

The STGO is an incomplete and sometimes confusing piece of secondary legislation. It deals solely with the notification process and does NOT contain any provision for SOA or PA response, nor does it contain any provision or process for haulier penalties for non-notification or non-compliance.

The STGO only works effectively where hauliers and plant operators recognise the absolute need for the notification process to take place, and where Structure Owning Authorities understand that the process is in place for their own benefit - to help them protect their structural assets.

It should be incumbent on SOAs to deal with notifications in a commonsense and sympathetic manner that recognises the commercial pressures that hauliers and plant operators face. This is not always the case, and can lead to increasing non-notification.

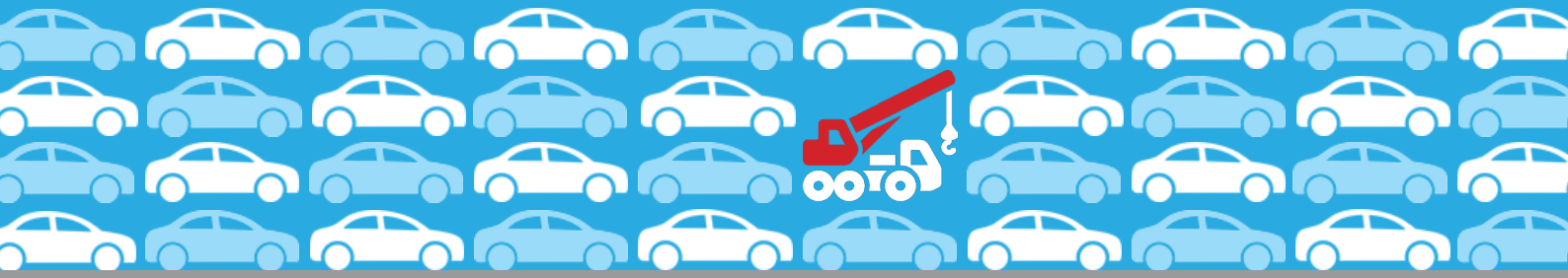
Abnormal load hauliers who notify in accordance with the STGO should be able to be confident that they are helping maintain the nation's bridge stocks in good order and that, if they are re-routed, that the re-route is necessary for structural safety or to minimise congestion. Again, this is not always the case.

The STGO notification process provides SOAs with an opportunity to check the passage of each abnormal load across their structures, and to respond to hauliers when they believe that notified vehicles cannot cross safely.

The process exists to protect the integrity and prolong the life of structural assets.

Why it is important for Structure Owning Authorities to check abnormal load notifications properly

Checking abnormal load notifications is a non revenue earning process for SOAs, which often comes under financial pressure. Although overloading bridges rarely causes immediate visible damage, much less failure, it does very much reduce their useful life.



The passage of a single abnormal load has the same effect on a bridge structure as the passage of several thousand cars. It is therefore essential that each SOA should have a fair and effective notification checking process in place.

Is a particular **bridge a bit suspect**? Does it have a **low capacity** rating?

Then, instead of using valuable engineer resources to check each notification, why not just take the easy way out and 'ban' all abnormal loads from passing over the bridge, saving expensive engineer resources? Send them somewhere else!

Regrettably, this approach does occur, even on major national routes, and the effect is to unnecessarily re-route vehicles at considerable extra cost to hauliers and to other SOAs whose structures are then put at risk. All this when a proper check may well show that the bridge in question can safely accommodate some or all of these vehicles, as Cascade's own experience has shown.

It is clearly **absolutely right** that a SOA should seek to prevent damage to its bridge stock. But it is **equally correct** that hauliers should expect their notifications to receive a **full and competent professional check**, and not to have their vehicles re-routed unnecessarily. They also have a right to expect authorities to understand their need to move quicker than the prescribed notification period in some commercially sensitive instances – mobile cranes, for example. If this does not happen, then why bother to notify? In present circumstances it is highly unlikely that they will be held to any account, and the only downside is to the lifespan of SOAs' bridges.

How then can SOAs check their abnormal load notifications securely and effectively and at reasonable cost? How can the differing requirements of hauliers and plant operators be reconciled with those of SOAs and PAs?

Clearly, this can only be achieved if SOAs and PAs utilise effective abnormal load management and checking systems and adopt a flexible and understanding approach to hauliers' commercial needs.

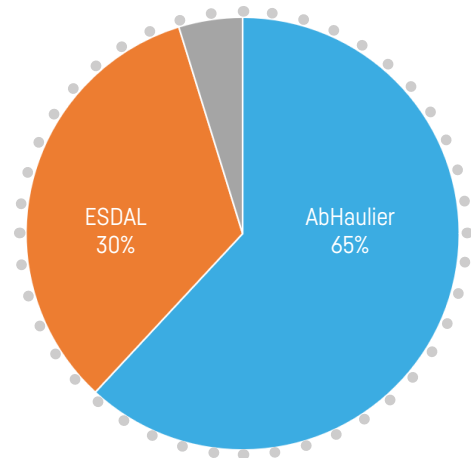
Abnormal load management and checking systems

There are three ways hauliers can submit abnormal load notifications to SOAs and PAs:

About 30% of abnormal load notifications are currently made by hauliers using the National Highways **ESDAL** website.

About a further 65% are sent by hauliers choosing to use Cascade Software's **AbHaulier®** and **AbHaulier LT** notification software.

The remaining 5% are sent by hauliers generally composing simple 'manual' emails in various formats.



There are three ways abnormal load notifications sent to SOAs and PAs can be managed and checked:

ESDAL

The SOA can elect to use ESDAL, a National Highways website which was originally set up to help hauliers and plant operators to prepare and send abnormal load notifications to the correct Structure Owning Authorities and Police Forces. It provides an ability for SOAs to monitor the 30% of notifications made through the ESDAL website, but not to communicate with hauliers directly, and only provides a rudimentary indicative capacity assessment (ICA) check facility.

Essentially ESDAL has only provided SOAs with a very basic monitoring system for the 30% of notifications placed through ESDAL. Responsible SOAs have had to make their own arrangements for detailed checking of ESDAL notifications as well as for the remaining 65% AbHaulier and 5% manual notifications.

Most SOAs have taken the option of receiving ESDAL notifications by forwarded email from the ESDAL website. AbHaulier notifications are sent directly to the SOA / PA and managing them both using Cascade's AbLoads or their own ad hoc system.

AbLoads®

AbLoads is Cascade Software's abnormal load management and structure checking software package, developed over 25+ years. It is used on an outsourcing basis by 25+ SOAs, and was used very successfully in many National Highways Areas until National Highways decided to try to manage abnormal loads in house using ESDAL.

AbLoads automatically enters and processes abnormal load notifications, both the 30% from ESDAL and the 65% from AbHaulier. The remaining 5% of 'Manual' notifications are fully catered for but take a little longer. AbLoads enables SOAs to manage and check every type of notification submitted using only one notification management system.

It is the only complete abnormal loads management package, incorporating email communications, mapping, data management and the AbLoads checking engine which is based on Cascade's 1990s bridge assessment programs *** ANALYSE *** and *** ARCH *** [see How well are structures really checked].

Other systems

There are many ad hoc 'manual' systems devised by engineering staff at SOAs, which utilise spreadsheets and mapping from which an operator has to manually determine the notified route, which structures lie on the route, whether the notified vehicle is acceptable over each structure, or whether there needs to be a more detailed resource-intensive check by a professional engineer. These systems are often computer based, some with their own bespoke software, and often try to prioritise notifications which can be risky. Within their limitations they can work well as far as they go. Network Rail use such a system. Inevitably there is generally an innate simplicity and therefore conservatism in the checking methods adopted, which means that hauliers are often unnecessarily re-routed. They are also much less productive, more resource intensive and therefore more costly.

ESDAL

ESDAL covers the whole of mainland UK. Each SOA is asked to provide data for its structures. Some authorities supply good data, some very little and some not at all. So, although ESDAL tries to help SOAs when they process ESDAL generated notifications, data limitations mean that they have to take a simplistic and very conservative approach in their 'indicative capacity assessments' (ICAs), simplistic in the simple structure modelling used and simplistic in that only overall bridge details are used and not more detailed data like spans and articulation.

As a result, hauliers may re-route themselves, or are re-routed by SOAs accepting these simplistic checks, often unnecessarily and at some cost to them. Because of all the difficulties inherent in cobbling together ESDAL with another system, SOA productivity is low and resource costs are therefore high.

National Highways is proposing to introduce an improved 'abnormal load structure assessment tool' ALSAT in ESDAL4. However, the basic lack of detailed data problem for ICAs remains unchanged for ALSAT.

SOAs using ESDAL to manage some notifications have to interpret the ICA/ALSAT data, if any, and then decide whether to use their own engineer resources for a more detailed check.

ESDAL cannot presently deal with the remaining 70% comprising AbHaulier and 'manual' notifications. There are plans to allow ESDAL to receive these notifications in ESDAL4, but the resource intensive task of determining the route from the notification email may remain, and any checking will still only be at ICA/ALSAT level leaving SOAs still with overall responsibility.

It is difficult to understand, but there are SOAs who just use ESDAL and ignore the 70% remaining notifications!

AbLoads®

Each installation of AbLoads is operated on behalf of a single SOA or a group of SOAs who have taken a positive decision both to better protect their structural assets and offer a fairer service to hauliers. The structure data required and provided is therefore more detailed than that required by ESDAL and allows for the more comprehensive checking provided by the AbLoads checking engine.

This incorporates runtime versions of Cascade's bridge assessment software as utilised in the 1990s national bridge assessment programme. The check of each bridge on a route is effectively a simplified assessment of that bridge for the notified vehicle, which is then directly compared with the effects of the assessed capacity loading(s) - ALL (HA), HB, SV, SO and individual Special Vehicle assessments.

The structure modelling used by AbLoads is therefore much more sophisticated than ESDAL's ICA/ALSAT tool. It models the bridge structure as a whole, taking full account of bridge span values and articulation ie. the nature of the connections between the component parts of the bridge. The effect of the vehicle, represented by its axle loads and spacings, is maximised by moving it across the bridge in both directions, a process that can lead AbLoads to evaluate as many as 100 load cases for a typical multispan continuous bridge.

The AbLoads engine uses ALL (HA), HB, SV, SO and individual Special Vehicle assessments. It also provides a facility for complex (special) bridges to be fully modelled and checked.

Because AbLoads is largely automatic, productivity is extremely good at about 200 notifications per operator per day, and resource costs are therefore low.

If structure and/or capacity data is available is at a lower level, the AbLoads checking engine has secondary simple and default checks which still take account of full vehicle dimensions.

Although there remains an element of conservatism in the AbLoads checking engine, it provides a check which is as safe and secure to the authority and as fair to the haulier as it is practicable to go without detailed engineer involvement.



5 Summary

The STGO

1 The STGO is an imperfect but necessary piece of secondary legislation. It is vitally needed to protect protect the nation's bridge stock, but to work effectively it requires flexibility and understanding in its operation by hauliers, SOAs and PAs alike.

2 SOAs need to remember that the process is in place entirely for their benefit. They need to appreciate and accommodate the commercial constraints under which hauliers operate, otherwise they will not get notified by hauliers.

3 SOAs need to check notifications fully, effectively and fairly, minimising any unnecessary and restrictive re-routing. Hauliers do want to comply and they will notify SOAs so long as they believe they are being treated reasonably.

SOAs have three management and checking system options available to them:

1 The ESDAL2 website is available, although it only deals with the 30% of notifications. SOAs can currently use ESDAL at this level, accepting that its checking process is simplistic and that they will need a parallel ad hoc system to manage the majority of notifications not generated by and available in ESDAL. They will also need to provide their own email communications and overall checking resource.

2 SOAs can make use of Cascade's long established and proven outsourced AbLoads system. AbLoads has had 25+ years of continuing development and provides a wide range of automated facilities. It is a complete system that can manage and check all notifications at a sophisticated level with a high degree of automation. Because of this, productivity is much higher than with other options and therefore resource requirements and costs are much lower.

3 SOAs can devise, maintain and use their own ad-hoc system, or continue to use their existing system.

Whichever choice is made, both ESDAL and ad hoc systems are resource and cost intensive.

Whilst both systems might be perceived as 'free', expert engineering resource must be utilised to check structures correctly and comprehensively, often diverted away from other important priorities.

Without this intensive and costly resource investment, the useful life of structural assets across a SOAs area may be cut short.

Although AbLoads and AbLoads Service are a commercial product, the cost savings achieved are more than 40% against managing notifications in-house. The comprehensive nature of the AbLoads checking engine ensures the useful life of structural assets is preserved for as long as possible and that bridge maintenance budgets are minimised.



Cascade provides a comprehensive abnormal load management service on behalf of:

BCP Council (Bournemouth, Christchurch & Poole), Birmingham City Council, Buckinghamshire Council, Cambridgeshire County Council, City of Edinburgh Council, Dorset County Council, Cheshire East Highways, Essex County Council, Gloucestershire County Council (incorporating Gloucester City Council and Cheltenham Borough Council), Hertfordshire County Council, Kent County Council, Lancashire County Council, Medway Council, Norfolk County Council, Oxfordshire County Council, Suffolk County Council, West of England Combined Authority (Bath & North East Somerset Council / South Gloucestershire Council and Bristol City Council), Wirral Council, Wokingham Borough Council and for Highways England ASC Area 9 working on behalf of Kier.

Leeds City Council (incorporating Wakefield Council, City of Bradford Council, Calderdale Council and Kirklees Council) use AbLoads software in-house. Hull City Council and Merton Council use AbLoads QuickCheck in-house.

Cascade also provides AbLoads Police to the Metropolitan Police and South Wales Police.

If you wish to discuss the AbLoads Service we provide with any of the clients we work on behalf of, we would be happy to provide their contact details once their permission has been given.

Our client list is correct at May 2022.

For more information

www.cascadesoftware.co

01483 811202



The average number of notifications quoted between ESDAL, AbHaulier and Manual notifications is representative of the average of each notification type across the areas Cascade manages.

