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Managing hefty trucks on snow and ice requires techniques many UK fleets never master. Ian Norwell travels to Scandinavia with Scania to see how drivers cope at -12˚C – and how the manufacturer's operationally-led research is changing the shape of trucks to come

The UK's weather does not lend itself to serious investment in training or hardware to cope with ice and snow. Or does it? At the time of writing, temperatures are hovering in the negative single figure Celsius range. But the rarity of snow for extended periods, as in the winter of 2010–11, makes most fleet managers question the value of equipment beyond winter tyres.

What matters most here is tribology – defined as 'the study of friction, and the science of interacting surfaces in relative motion'. A full appreciation of its fundamentals is essential to safe driving on snow and ice. Road users on two wheels, powered or not, swiftly develop an instinctive grasp of the friction of different road surfaces, wet or dry. That's key to survival. So how do you emulate that in a truck?

With Richard Ramberg – one of Scania's

Truck manufacturers' R&D yields vital feedback for new products, but does it reflect the cut and thrust of real world conditions? Yes, if it includes fleet operations – as this 10-axle, 31.5 metre combination in Sweden proves

The bigger picture

Scania Transport Laboratory (STL) started back in 2011, handling parts movements between Södertälje, near Stockholm, Scania's factory in Lolland, southern Sweden, and its plant at Zwolle in the Netherlands.

Since its launch, the operation has significantly expanded its fleet and taken on a bus operation, too. Most importantly, it now boasts Euro 6 tractor units with in excess of 1.3 million km under their belts.

Although the stress of looking for new business is absent at STL, the usual commercial imperative of delivering freight on time is certainly part of its psyche. Yes, it is essentially an extension of Scania's R&D department, but it runs as an independent haulage company feeding back real data from what is undeniably an intensive trunking operation.

The difference is that

Winter tyres come into their own on packed snow. But in Sweden they're not the only game in town

demonstration test drivers from Södertälje, Norway – in the passenger seat, I set off in a timber haulage combination on a forest road with compacted snow and ice. It's a typical forestry extraction vehicle used in the Trysil region, 150km east of Lillehammer. An R520 6x4 rigid, it is coupled to an A-frame four-axle drawbar trailer, and grosses at 60 tonnes.

60 tonnes on snow

Having just walked down the road and nearly lost our footing, we know what's under the tyres. "The road through the forest to the local highway is a challenge, but the speeds are lower and it's easier to see what you are dealing with," Ramberg reassures me. However, once out on Highway 26, the speeds are up to 80kph, and, with two articulations behind us, handling this truck is a little counter-intuitive.

On UK and near continental driving in warmer conditions, we are all familiar with using retarders, intarders and engine brakes to give that friction-free checking of speed that keeps fleet workshops happy with lengthy reline schedules. But I quickly discover that this technique could have you heading for the trees in Trysil's conditions.

With seven axles on the ground, you need braking effort from all of them. A retarder only acts on the two driven axles of this train, so running down a gradient in icy conditions and using only a retarder, you are operating with an un-braked trailer and asking for instability. Add the high centre of gravity on timber operations, and this isn't going to be pretty. Foundation brakes are the safest option here – but

STL gets new trucks and components many months, even years, before they are officially launched – including Euro 6 tractor units, which it has been running since 2010. And, importantly, the mileages involved allow an accelerated assessment under real operating conditions – with the long-haul division working a triple-shifted timetable and each truck clocking up more than 360,000km annually.

Anders Gustavsson, managing director of STL, spent 25 years in R&D at Scania before agreeing to set up the operation. Now, it is regarded as a vital part of the jigsaw in product evaluation, running a fleet of 35 trucks, 150 trailers and 96 drivers. "This is a complement to our regular testing activities, and it is proving to be a valuable one," he confirms and he points to its early adoption of 25.25 metre truck and double trailer combinations.

Gustavsson says STL continues to stretch the limits, "The productivity gains we saw from the 25.25 metre units made us wonder how much further can we go," he muses. And the answer comes in the shape of two units running under special dispensation in Sweden. Operating daily between Södertälje and Malmö, these combinations comprise a 4x2 tractor and tri-axle semi-trailer, but with an added A-frame drawbar with two axles attached to the A coupling, and a further three at the rear.

This is a 10-axle, 31.5 metre combination with a gvw potential approaching 78 tonnes. "These are clearly highly specialised outfits and they run between breaking areas where the trailers are separated," explains Gustavsson. "They are not suitable for any kind of urban operation but, in the right place, we are seeing 20% fuel reduction per tonne moved, and even bigger cuts in CO_2."

For him, it's about STL's other role – that of a customer from the future. "This kind of intensive transport is where many hauliers will be in years to come," he predicts.

Feedback loop

Measuring lifecycle costs and uptime is central to STL managing director Anders Gustavsson's work and he is canny enough to have a few competitor chassis in the fleet. Next to the home-grown tractors, he's running a Mercedes Actros, a Volvo FH-420 and a 410bhp MAN.

Drivers are similarly varied, with a mix of age, experience and gender, and all are naturally very familiar with Scania's driver support (SDS) in-cab driving analysis tool. This has now been extended to provide a wireless instrument cluster (a tablet) that can analyse journeys, taking live data from the vehicle. WICkit (wireless instrument cluster) gives trainers real-time data.

For incurable data-junkies, Scania has also launched a Black Griffin wrist watch that displays similar information. That'll be for owner-drivers then. There's a limited edition of 999, so get yours while stocks last.

Automatic sanding ahead of the drive wheels can make all the difference to traction setting off

with a light foot and plenty of anticipation.

The scope for error is even more apparent on an eight-axle 25.25m combination, at 66 tonnes gross. With an 8% gradient running for more than 6km, it is a lot more relaxing on a climb than on a descent. Meanwhile, Highway 26 is part of a main road from Trondheim that runs south to Sweden, designated a 'black road', meaning it should be cleared of snow and, well, black. But when the snow blows across it, conditions change fast.

Returning from the highway test drive and rejoining the forest track, winter tyre traction was put to the test. Hauling in excess of 60 tonnes up a mild gradient with just four tyres providing drive is impressive. No chains or studs here, just a set of Continental HDR2 winter M+S (mud and snow) 385/55 R22.5s and a lot of weight. Winter tyres are compulsory in this area, as is carrying snow chains.

Life's a beach

Winter fuel, with extra anti-waxing additives is also routine. But it only needs a slight gradient approaching traffic lights to catch out the novice. Warm tyres sitting on compacted and glazed snow, will melt just enough water during an ATS phase to remove that last vestige of traction. But devices are available, and when a driver feels he or she is losing grip, or anticipates a stop at a suspect set of lights, an automatic sand spreader can make the difference between keeping going, or grinding to a halt.

Chassis-mounted, and set immediately in front of a drive axle, it deposits heated sand on the road. Used judiciously, moments prior to an unavoidable halt, it gives enough grip to resume. Finn-Ero Bustadmo, from Norwegian sand spread maker Autoline, says they are de rigueur for winter operations. "You only need one truck to get stuck to block a road. And if it's for the lack of proper equipment, you won't win any friends out here."

But my seven-axle drawbar timber truck has another trick up its sleeve. The rear bogie on the 6x4 rigid obviously doesn't have a lifting axle, but traction can be influenced by adjusting the air suspension. With the bogie rated at a little under 20 tonnes, adjustments can be made on the fly, and the maximum re-apportioning allows up to 14.6 tonnes to be borne by either axle.

"There's a dashboard display telling you exactly how much weight is being borne by each axle, and a temporary shift from the normal balance can get you through a difficult section," explains Veronica Andersson, another Södertälje test driver. "Most of these devices are only of benefit with good observation and planning though. A driver needs to anticipate and act before there is a problem, not after it has arrived."

So what can UK fleet engineers learn from Nordic

long-haul operators? Is their environment so far from UK experience to be of little relevance? I don't think so. Fleets operating in Scotland, or for that matter operators running animal feed distribution in the Peak District, could take a few notes. How many times do you need to have a delivery stuck to invest in a sand spreader, for example?

And, certainly, the consequences of an articulated combination getting out of shape because a driver used that retarder – as you've been drumming into him – but at the wrong moment, might make you want to review your DCPC syllabus. It's about taking a leaf out of the experts' winter driving book.

As ever, our biggest issue is the weather. In the UK, we only get samples, and recent winters have felt more like extended autumns. Watching the professional test drivers from Scania at work on ice and snow is impressive, and it's easy to pick up useful tips. But I came away with two lasting impressions.

First, the streets of Oslo deal with normal traffic every day on packed snow with no dramas. Everyone quietly and competently goes about their business. Secondly, and most striking, is the difference made by winter tyres. Reckoned to be of economical value at anything south of +7ºC, their ability to convey more than 60 tonnes up a forest gradient of packed snow, with only two out of eight axles laying down traction, is an experience that gives me renewed respect for them. TE