

PARLIAMENTARY DEBATES

HOUSE OF COMMONS
OFFICIAL REPORT
GENERAL COMMITTEES

Public Bill Committee

AUTOMATED AND ELECTRIC VEHICLES BILL

Third Sitting

Thursday 2 November 2017

(Morning)

CONTENTS

CLAUSE 1 agreed to.

CLAUSE 2 under consideration when the Committee adjourned till this day
at Two o'clock.

No proofs can be supplied. Corrections that Members suggest for the final version of the report should be clearly marked in a copy of the report—not telephoned—and must be received in the Editor’s Room, House of Commons,

not later than

Monday 6 November 2017

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The Committee consisted of the following Members:

Chairs: MR ADRIAN BAILEY, † SIR EDWARD LEIGH

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|---|---|
| † Argar, Edward (<i>Charnwood</i>) (Con) | † Mann, Scott (<i>North Cornwall</i>) (Con) |
| † Brown, Alan (<i>Kilmarnock and Loudoun</i>) (SNP) | Rodda, Matt (<i>Reading East</i>) (Lab) |
| † Duffield, Rosie (<i>Canterbury</i>) (Lab) | † Stephenson, Andrew (<i>Pendle</i>) (Con) |
| † Efford, Clive (<i>Eltham</i>) (Lab) | † Stewart, Iain (<i>Milton Keynes South</i>) (Con) |
| † Foxcroft, Vicky (<i>Lewisham, Deptford</i>) (Lab) | † Tracey, Craig (<i>North Warwickshire</i>) (Con) |
| † Hayes, Mr John (<i>Minister for Transport Legislation and Maritime</i>) | † Turner, Karl (<i>Kingston upon Hull East</i>) (Lab) |
| Jones, Graham P. (<i>Hyndburn</i>) (Lab) | † Western, Matt (<i>Warwick and Leamington</i>) (Lab) |
| † Kerr, Stephen (<i>Stirling</i>) (Con) | Farrah Bhatti, Mike Everett, <i>Committee Clerks</i> |
| † Knight, Sir Greg (<i>East Yorkshire</i>) (Con) | |
| † Letwin, Sir Oliver (<i>West Dorset</i>) (Con) | † attended the Committee |

Public Bill Committee

Thursday 2 November 2017

(Morning)

[SIR EDWARD LEIGH *in the Chair*]

Automated and Electric Vehicles Bill

11.30 am

The Chair: I will say a few words before we start. Obviously, everybody should turn off their mobile phones and devices. The selection list for today is available in the room and on the Bill's webpage. It shows how the selected amendments have been grouped for debate. Amendments grouped together generally deal with the same or similar issues. The Member who has put their name to the lead amendment in a group is called first; other Members are then free to catch my eye if they want to speak on all or any of the amendments within that group. A Member may speak more than once in a single debate.

At the end of the debate on a group of amendments, I shall call the Member who moved the lead amendment again. Before they sit down, they will need to indicate whether they wish to withdraw the amendment or seek a Division. If any Member wishes to press any other amendment or new clause in a group to a vote, they need to let me know.

I shall work on the assumption that the Minister wishes the Committee to reach a decision on all Government amendments if any are tabled. Please note that decisions on amendments take place not in the order that they are debated but in the order they appear on the amendment paper. In other words, debate occurs according to the selection list; decisions are taken when we come to the clause affected by the amendment. I shall use my discretion to decide whether to allow a separate stand part debate on individual clauses and schedules following the debates on the relevant amendments. I hope that this explanation is helpful.

Clause 1

LISTING OF AUTOMATED VEHICLES BY THE SECRETARY OF STATE

Karl Turner (Kingston upon Hull East) (Lab): I beg to move amendment 1, in clause 1, page 1, line 10, at end insert—

“(1A) The Secretary of State must consult on and publish the criteria that they will use to determine whether, in their opinion, a motor vehicle is designed or adapted to be capable, in at least some circumstances or situations, of safely driving itself without having to be monitored by an individual.

(1B) The Secretary of State may not change the criteria without consulting vehicle manufacturers, insurers and other such persons as the Secretary of State considers appropriate.”

This amendment requires the Government to consult on and publish criteria for the definition of “automated vehicles” that will be used by the Secretary of State.

The Chair: With this it will be convenient to discuss the following: amendment 8, in clause 1, page 1, line 10, at end insert—

“(1A) The Secretary of State may only add a vehicle to the list if the Secretary of State is satisfied that the vehicle's software has been approved for safe use on roads or in other public places in Great Britain.”

This amendment would ensure that vehicles cannot be listed as automated vehicles by the Secretary of State unless he or she is satisfied that the vehicle's software has been through an approval process (see NC11).

New clause 11—*Approval of automated vehicle software*—

“(1) The Secretary of State must set out in regulations a system for approving automated vehicle software.

(2) These regulations must, in particular, make provision for—

(a) the criteria to be used in the approval process to determine whether automated vehicle software is safe for use on roads or other public places in Great Britain, including, but not limited to the way in which the vehicle is programmed to—

(i) deal with moral judgements, and

(ii) transition between driving itself and being driven by a person.

(b) the process by which manufacturers of automated vehicles may apply for software approval, including, but not limited to, any inspection and testing that the vehicle may be required to undergo, and

(c) the process by which manufacturers of automated vehicles may appeal if their software is not approved.

(3) In this section, a “moral judgement” refers to any situation where an automated vehicle has, and makes, a choice of action during an accident while the vehicle is driving itself.

(4) In this section and section 2, the definition of transition of an automated vehicle “between driving itself and being driven by a person” may be set out by the Secretary of State in regulations.

(5) Where a statutory instrument contains the first regulations made under this section, the instrument may not be made unless a draft of it has been laid before Parliament and approved by a resolution of each House.

(6) A statutory instrument containing regulation under this section, that is not the first such regulation made under this section, is subject to annulment in pursuance of a resolution of either House of Parliament.”

This new clause would require the Government to establish a system for approving automated vehicle software. The approval process would include an opportunity for manufacturers to appeal against a failed approval process. Criteria for approval would include consideration of the way in which the vehicle was programmed to deal with moral judgements.

Karl Turner: It is always an absolute pleasure to serve under your chairmanship, Sir Edward. I am grateful for the opportunity to speak to the Bill generally and to the amendments tabled in my name, to which I will come shortly.

This is an exciting opportunity for the Committee to speak about the potential to liberate many people currently excluded from access to rural transport. The Bill also provides opportunities to improve personal transport arrangements, as well as air quality, which is crucial given the dire state of the environment and its impact on health. I begin by thanking the Minister personally for his collegiate approach to the Bill, and for his co-operation and assistance in the preparation for this sitting. He even allowed my staff access to his officials. It is genuinely appreciated.

Amendment 1 would improve the Bill, and I know that the Minister is intent on improving it. It would require the Government to consult on and publish criteria for the definition of “automated vehicles” that

the Secretary of State will use. As the Committee can see, clause 1 as currently drafted puts the onus on the Secretary of State to define, in his or her opinion, what constitutes an automated vehicle, without having to consult the sector. In my view, the Bill would be vastly improved by a requirement to consult on and publish the criteria by which “automated vehicles” will be defined.

Secondly, the amendment would prevent the Secretary of State from changing the criteria without consulting vehicle manufacturers, insurers and other such persons as the Secretary of State considers appropriate. We ask for that consultation and publication of the criteria because it is crucial that manufacturers, vehicle owners and insurers know them, whether they are making, buying, warning about or insuring an automated vehicle, and whether the scope of the legislation applies to their vehicle. In the evidence session, the insurance industry welcomed the Government taking on the responsibility of saying what is an automated vehicle, but we are still concerned that the Bill as drafted leaves the Secretary of State with total discretion on what is an automated vehicle. We therefore tabled the amendment to provide greater clarity and to help the Government by ensuring that the relevant persons and organisations will be sufficiently involved, to inform the Secretary of State’s list of automated vehicles.

The Opposition believe that the additional clarity provided by the amendment would help to create a more reassuring environment and to encourage the development and uptake of automated vehicles. As I said, the amendment would also prevent the Secretary of State from changing the criteria without further consultation, and guarantee that the criteria used will be up to date and as practical as possible in a very fast-moving sector. We have rehearsed these matters previously so I do not want keep the Committee on this point for too long.

I have had the opportunity to look at *Hansard*; in the Committee for the Vehicle Technology and Aviation Bill, the Minister promised to go away, think about it and amend the Bill appropriately to tighten the definition, but that does not seem to have happened. I do not mean to criticise the Minister personally, but the Government have had six months to think about that. The only change that I can see is in clause 1(b) but that is just semantic. We intend to press the amendment to a Division.

Clive Efford (Eltham) (Lab): It is a pleasure to serve under your chairmanship once again, Sir Edward. I have had a number of informal chats with the Minister as we have bumped into each other while wandering around the House. I appreciate his approach to the Bill. My amendments are genuinely to try to probe the area, which I find fascinating, of the interaction between artificial intelligence and human behaviour. Nowhere more than in our transport systems will this become more prevalent over the coming years. My amendments are to probe the areas where I think that that comes into sharp focus.

When we boil it down, we are legislating for vehicles that are driven by computer software, as we heard in the evidence. We heard from the witnesses on Tuesday that we are legislating exclusively for tier 4 and tier 5 of the five tiers. The tiers start with driver-assisted systems such as braking, steering and parking, through to automated vehicles that can switch between being driven by a

human and by software at tier 3, which overlaps into tier 4, and to tier 5, which is purely automated vehicles. The legislation really challenges us as legislators, because by simplifying the insurance system we are being asked to enable our roads to become laboratories to sharpen that technology. We heard clearly in the evidence that there were different attitudes to what is taking place. When asked about tier 5 technology, Mr Wong, from the Society of Motor Manufacturers and Traders, said:

“As to when those level 5 vehicles without steering wheels are capable of performing end-to-end journeys—from my house in the village to my office in the city—that is anybody’s guess. That will probably be some time in the 2030s. It is quite complex.”—[*Official Report, Automated and Electric Vehicles Public Bill Committee*, 31 October 2017; c. 43, Q98.]

However, we then heard from Mr Boland of Five AI, who told us that automated vehicles would be on our roads in 2019, albeit in an experimental fashion.

This is a big challenge for us. We need to consider the software in great detail, and the Secretary of State needs to be given the power to set and oversee certain standards. Mr Wong referred to the report written by the Ethics Commission on Automated Driving for the German Federal Ministry of Transport and Digital Infrastructure. I am a bit of an anorak, so I have started reading that report, although I have not got through all of it in the last 48 hours. It makes fascinating reading. The commission’s approach is that the technology is there to improve safety, whereas our attitude seems to be that it is a technological advance to help industry, and that improving safety and social inclusion will be a by-product a long way down the line.

The operation of the software raises some ethical issues. I asked the witnesses about how the software would perform and take decisions when an accident is imminent. For instance, imagine a four-year-old toddler walking in front of a vehicle that cannot stop to prevent a collision. To the left is oncoming traffic, with the risk of a head-on collision; to the right are perfectly innocent bystanders on the pavement or at the bus stop—those are the vehicle’s options. Mr Wong noted that this was the “classic trolley problem” referred to in the German ethics commission’s report. The commission’s conclusion was that it is simple to make a decision when the choice is between property damage and human injury, but when the choice is between different types of injury to different road users or innocent pedestrians who are not part of the scenario, we move into a completely new area of morals and ethics. We have to be prepared for that; these situations will take place on our streets, and we need to legislate for them. We should give ourselves the opportunity to oversee this software before it is allowed on the streets. Amendment 8 would give the Secretary of State power over the software’s approval, and new clause 11 would set out the approval criteria.

Sir Greg Knight (East Yorkshire) (Con): Does not clause 1(1) already cover what amendment 8 seeks to achieve? Paragraph (b) requires that the Secretary of State be satisfied that vehicles are

“designed or adapted to be capable, in at least some circumstances or situations, of safely driving themselves.”

In making that decision, surely the Secretary of State would take into account the nature of the software.

Clive Efford: We would hope so. In the general terms in which the Bill is drafted, that is quite possible. Amendment 8 is a probing amendment, and I will not

[Clive Efford]

press it to a vote, but this is an area that as legislators we need to scrutinise. The software is key. That is what will be making the decisions and that is what will be driving the vehicle.

We seem to have started this discussion in terms of this being a mechanical problem about how to develop a piece of technology that can read all the different scenarios on our roads and react accordingly, but looking at the research—vehicles' different speeds, any delay in the transition between a driver and an automated vehicle—an awful lot of the issue around the software is not referred to in the Bill. I am attempting to draw attention to that and to put in the Bill that it is the crucial area of the technology and we should pay attention to it.

11.45 am

In particular, new clause 11 refers to the moral argument, which goes back to the point about the choice—the choice between property and injury is an easy moral question to answer, but then we might have to make a choice between two scenarios on the road. Mr Wong referred to a “minimal risk manoeuvre”, which sounds fine as an answer in Committee, but a minimal risk manoeuvre might be the result of a choice between injuring one party or another in a risk situation on the road, and that is a serious moral dilemma. How do we decide on the type of software, choices, algorithms, or whatever we want to call the calculations that will undeniably have to be made in the vehicles? It is not possible in all scenarios, as was described to us, for a vehicle simply to come to a safe stop. Some situations will be unavoidable.

At the experiment the Minister visited down in Greenwich, where automated vehicles are being tested, there was an incident in which someone pushed a plastic chair out in front of the vehicle. The vehicle did not stop and it hit the chair. That was not a scientific test, but it demonstrated that there are circumstances in which things will happen. The vehicles will have to make choices in such circumstances and we should be legislating for that. We should at least give ourselves the power to be able to react and respond in future as the technology develops.

I am not arguing against that technology—it is something that has arrived, and its time is here. As I was discussing with the Minister the other day, that capacity exists in air transport. We could fly passenger planes and they could take off and land perfectly safely without a pilot on board. In an emergency situation, they could be flown remotely by someone in air traffic control. If that capacity were tested in the market, however, all the evidence suggests that people would not buy a ticket, in spite of the fact that almost the entire flight of any flight that anyone undertakes today is done by a machine—by the technology—and some of that technology even shuts the pilot out now, because having the pilot interfere with it is not safe. We do not have that capacity in our air industry, however, because of public opinion.

The House of Commons Library tells me that the air industry would save £31 billion, so there is a big incentive for it to have that capacity, but it has not. We are legislating to have it on our roads, but we are not legislating to control the key bit of the technology, which is the software. That is why I tabled my amendments.

Sir Oliver Letwin (West Dorset) (Con): Before I launch into the subject, Sir Edward, may I seek your guidance on a question of procedure? I want to make some points that I wish to bring to the Minister's attention. They relate to the amendments, but more precisely to the clause. Shall I make those points in the stand part debate or now?

The Chair: No—if they relate to the amendments, make the points now. If the right hon. Gentleman speaks out of order I will call him to order.

Sir Oliver Letwin: Thank you, Sir Edward.

As the Minister knows, two specific issues in the Bill concern me and led me to seek to be part of the Committee. One relates to the question of the strict liability of insurers when the vehicle is operating automatically, which of course relates to the software and its safety—the subject of this group of amendments. I have suggested to the Minister two possible approaches to resolving that problem, which was exposed in our evidence sessions. One of those relates to clause 1(1) and would probably require a somewhat different amendment from those that have been tabled, albeit broadly of the same kind. Let me first explain the problem and then try to suggest the solution.

We established clearly from the insurance industry representatives we questioned that, as the Bill is currently drafted, strict liability will attach to the car rather than to an individual, which is an entirely new phenomenon in insurance law. Let us suppose that there is not a fundamental legal problem with strict liability attaching to the insurer of a car. I make that assumption, although I do not necessarily think that it is a safe one; that may be explored further in the other place by lawyers with much deeper acquaintance with insurance law than I claim to have.

Supposing that that is a feasible arrangement, we then face the question: at what point should that strict liability clock in? That would not be a material question if the machine was never driven by a human being but was driven only by the machine itself. As the hon. Member for Eltham pointed out, that was raised during the evidence session by the rather enterprising group that will create service operations on London's streets out of what are, in effect, level 5 vehicles way ahead of the schedule that other witnesses suggested would apply. Such vehicles clearly will never have a human being driving them; they will be automated objects that human beings will get into. As it is currently drafted, the Bill will therefore create a strict liability for the insurers. On the happy assumption that that will work legally, insurers will insure those vehicles, they will discover whether that is a very expensive proposition and that will get built into the service price. I am not worried about that from a legislative point of view.

However, I think that the Minister would agree, as all our witnesses seemed to, that it is extremely likely that, in parallel with that rapid roll-out of highly automated level 5 items, for perhaps many millions of motorists there will be a gradual progression—not necessarily strictly demarcated as level 3, level 4 and so on—from vehicles that are largely driven by a driver but somewhat assisted by the machine, to vehicles that are driven by the machine under more and more circumstances but are sometimes driven by the driver.

I certainly do not think that we should legislate on the assumption that we know what the future will look like, but it is highly likely that there will be a stage at which there are vehicles that, for example, are well designed to operate on motorways on an automated basis. The nation may benefit hugely from them operating in that way, because it is safer and allows much shorter distances between vehicles and therefore much more intensive use of motorways, which diminishes capital investment in the motorway system, improves safety and prevents the environmental damage that building more motorways would occasion, so that may well in fact become compulsory at some point. However, those very same vehicles may be ill-designed to deal with country roads, city roads or other kinds of road, so they may well have a function that enables them to be switched back and forth between automated driving and being driven by the driver.

We heard rather different things from witnesses about that switchover. To tell the truth, I think that that is because nobody really knows how it is going to operate. The history of technology is littered with prophecies from experts about how future technologies will operate that have proved to be false, so the Committee would be wise to assume that we do not know, and will not know when legislating, how exactly the switchover between driver and automated vehicle will occur.

Mr Wong suggested in an evidence session that the vehicle itself will offer up to the driver the opportunity to switch over to automation in circumstances in which the vehicle is sufficiently intelligent to know that it is safe for it to take over the driving, and that it will never otherwise offer up that opportunity. It is perfectly sensible that if the vehicle offers itself to the driver to take over operation, and if the driver allows it to take over operation, the vehicle becomes the driver, and the strict liability of the insurer attaches to the vehicle and not any longer to the person. That would be fine.

However, if, as some other witnesses seemed to think was the case, it is the driver who will, at least in some circumstances, make the decision of whether to switch over to automated use, this becomes a highly material question: has the driver made that decision in a reasonable and sensible fashion? The reason is that if the driver has not made the decision in a sensible and reasonable fashion, and if the insurer of the vehicle is nevertheless bound to have strict liability for the vehicle taking over the action, insurers could be faced with enormous bills in circumstances in which what they were actually doing was facing a bad decision by a person whom they had never insured; they had insured the vehicle and not the person. That is the problem we need to address, which brings me to the question of clause 1(1).

The Minister for Transport Legislation and Maritime (Mr John Hayes): I am delighted that my right hon. Friend has looked into these matters with typical assiduity. I am also delighted to serve under your chairmanship, Sir Edward. I briefly say that, as I have risen for the first time. I know that your sagacity in the Chair will match the warmth of your friendship and the generosity of your home, which you have offered me just this week at a dinner party. Anyway, let us leave that to one side.

The Chair: Flattery of the Chair will get the Minister nowhere!

Mr Hayes: I like dancing on the head of pins—I think it is an appealing thing to do—but we must be careful to avoid it in this Committee, because time does not permit it, many hon. Members want to contribute and there is a slight risk from doing so in this case. I will make this argument as quickly as I can. The key issue about an event that took place while the vehicle was in autonomous mode is not the point at which it went into autonomous mode, but the events at the point at which the incident occurred. If we can be very clear that the vehicle was being driven autonomously at the time of an incident or accident, that becomes the salient issue, rather than what might have happened five minutes or half an hour before, when the driver switched it to autonomous mode, because of course the circumstances of its being autonomous will then become absolutely clear, and at that point the liability is not in question.

I take the point that whether the vehicle should have been in autonomous mode may be material and I shall explore that more when I respond to the debate, but I think that it is what happens at the point of the accident that is of greatest concern. I just put that to my right hon. Friend the Member for West Dorset for further consideration.

Sir Oliver Letwin: I have considered that and I think that is the assumption. My right hon. Friend has well exposed the logic that underlies the current drafting, and it is in error, in my view, because although of course the material moment is the moment of the hypothetical accident, the cause of the accident is the material question from the point of view of the operation of our insurance system, and if the cause of the accident was a bad decision by the person, there is an illogic that will eventually undo all the good we are trying to do if nevertheless the insurer of the vehicle has strict liability. The fact that it may have been five, 20 or 55 minutes before the accident that the person handed over control to the vehicle is irrelevant if the basis on which the person handed over control was wrong and the person made the wrong decision. It seems to me that the question we need to address is this: is it possible that the person should have made such a wrong decision, or have we eliminated that possibility? That is what I want to get on to, because that is where clause 1(1)(b) needs to have a (c).

Sir Greg Knight: Is it not highly likely that this sophisticated vehicle will prevent the driver from seeking to put the vehicle in automated mode if it is unsafe to do so? It will reject the request.

Sir Oliver Letwin: I am grateful to my right hon. Friend for asking that question because it leads me to exactly the point I want to raise in relation to 1(1)(a), (b), and, as I think it may need to be, (c).

12 noon

It is indeed possible that the proposition that my right hon. Friend the Member for East Yorkshire has put, which is exactly the proposition put by Mr Wong in the evidence session, will happen and that vehicles that are capable of genuine automated driving will have sufficient intelligence built in so that they will offer to take over only if it is totally safe. If that is the proposition on which the Minister wishes to base the legislation,

bearing in mind that we do not actually know at the moment whether the technology will go in that direction, it seems what is needed is an amendment or a new subsection—clause 1(1)(c), or thereabouts—that makes it clear, and this relates to the Opposition amendment, that the Secretary of State will have the power to approve a fully automated system only if the Secretary of State has verified that that system will always safely determine its own capability to take over the car.

Mr Hayes *rose*—

Sir Oliver Letwin: I will give way, of course, in a moment.

Such a course of action is fine and would solve the problem that I have advanced, because the Minister or Secretary of State, or an expert acting on his or her behalf, would have verified in advance that the machine was capable of taking over and would take over only under safe circumstances. Before I give way to the Minister, I want to point out that that is using the law to limit the technology, and the history of the approach to that in our country's legislation has been very bad. I will not go into all the history, but I am happy to write the Minister a memorandum about it if he wants. I once wrote an article about this. There is a very long history of Parliament trying to prejudge the technology, legislating on the assumption that it will be only that technology, mandating therefore only that technology, and discovering that there is not any of it and that people elsewhere are manufacturing things that we do not get because they do not fit our legal system. It is not the route I recommend, and I will come back to that when we get to clause 2. It is a possible route, however, and one that the Minister should at least consider.

Mr Hayes: I will speak more about my right hon. Friend's last point when I respond to the debate as a whole, because of course it relates closely to the shadow Minister's point about how far we define what we do now. The Bill is an attempt to thread a course between creating sufficient certainty to establish a framework to allow further development and, on the other hand, doing exactly what my right hon. Friend has mentioned in trying to predict a future that may not come to pass. He is right to raise that and I will deal with it in greater detail.

On the specifics of his point about liability, I draw his attention to clause 3(2), which we will debate later. You will not let me debate it now for that reason, Sir Edward, but clause 3(2) specifically talks about the subject that my right hon. Friend describes, because it draws attention to the possibility of an accident being

“wholly due to the person's negligence in allowing the vehicle to begin driving itself when it was not appropriate to do so.”

That is very much what my right hon. Friend speaks about, and it is why we put it in the Bill. He makes a separate point—a good one—about technology that kicks in of its own accord because the technology, the software, determines that it is better at that point for the vehicle to be driven autonomously. We will explore that in greater detail as we consider the legislation. I simply draw his attention at this stage to clause 3(2).

Sir Oliver Letwin: I recognise that I am treading on your indulgence, Sir Edward, but, as the Minister has mentioned clause 3(2), I will briefly point out,

although no doubt we will discuss this later, why I do not think that it solves the problem. It is possible that it is susceptible to redrafting so that it will, but it is ill drafted if the intention is to solve the problem I have raised. In the first place, it says, “wholly”, in that it is “wholly due to the person's negligence”.

That is an almost impossible thing to establish. As currently drafted, it does almost no heavy lifting at all. I think I know why a parliamentary draftsman has nevertheless inserted the word “wholly”, because, like the Minister, I have had quite a long experience of dealing with parliamentary draftsmen on numerous Bills. I know that they think through carefully the question of what happens if we do not put in a word such as “wholly” under these circumstances.

The Chair: Order. The right hon. Gentleman is gradually wandering from the strict road that relates to the amendment. He can always come back on clause stand part, and I have allowed him a lot of indulgence so far. I know he will return to the amendments.

Sir Oliver Letwin: I am grateful, Chair. I will leave it at that so far as clause 3(2) is concerned, but I will no doubt come back to it.

Finally, if it were the intention of the Minister to add to clause 1(1), rather than to do something to clause 2 or clause 3, which we will come to later, it would be important to establish whether the view taken by Mr Wong—that these machines will always be designed in such a way that they decide on a safe basis whether to take over—is a consensual view across the industry in every country or a happenstance view of some particular technologist.

Clive Efford: Again, the right hon. Gentleman is touching on the area of ethics—it is covered in the excellent document written by the German Transport Ministry—which is about freedom of choice and the question of whether the individual driving the car should succumb to the superior knowledge of the software that has been put in the vehicle and have control of the vehicle taken away from them in certain circumstances. We have not discussed that issue, but it could arise as a consequence of the Bill. That is why I suggest we look carefully at the software. There is a major question about the freedom of choice of an individual driving their car if we allow the technology to take decisions away from the driver.

Sir Oliver Letwin: Yes, I agree with the hon. Gentleman. Sharing his anorak tendencies, I too have been interested in the German case. In fact, I spent some while talking to German officials and motor manufacturers about the issue. Actually, I think there is a serious problem—this is the final point I want to raise—with clause 1(1)(b), which relates specifically to the questions of ethics that he raised. I want to draw the Minister's attention to the word in clause 1(1)(b), “safely”. [*Interruption.*]

The Chair: Is it No. 10 on the phone?

Sir Oliver Letwin: Undoubtedly so—it is No. 10 calling the Minister to higher things, yet they may not be of such great significance to our future as the Bill.

In clause 1(1)(b), the Secretary of State is asked to opine on whether the vehicle that is being approved and put on the list is capable of “safely driving”. An awful lot will hang on that word “safely” in what will probably be a rich jurisprudence over many decades. The hon. Member for Eltham is rightly drawing our attention to the fact that “safely” in this context could mean something technical—is the machine technically sophisticated enough to deal with circumstances—or it could mean something much deeper. It could mean the ethics and applied intelligence built into the machine so as to produce views or choices that accord with the social preferences of Parliament about, in trying to minimise the effect of an accident, who is to be sacrificed under circumstances where two different groups of persons could be sacrificed. Alternatively, it could mean any other set of very complicated ethical choices.

I of course bow to the Department’s legal advisers, parliamentary counsel and any external counsel, but my own hunch is that there is not enough jurisprudence available to guide us on whether “safely” will bear that amount of weight. I wonder whether the Minister should consider at least giving the Secretary of State the duty in due course to consider not just whether the machinery is capable of driving “safely”, but whether it is capable of driving—I do not know quite what words parliamentary counsel would want to choose—ethically or properly or in a socially desirable way. That is an odd kind of question to ask about a machine, I grant, but these are odd machines we are considering.

The hon. Member for Eltham is on to a good thing with amendment 8, even if he does not press it to a vote, because he raises an issue we will have to address. What we all do not want to get to—I think the Committee is united in this—is a sort of red flag situation where machines have been authorised because they have a large amount of technological wizardry in them that makes them highly sophisticated, but they make choices that any sane Parliament or Government, or indeed public, would regard as wholly morally objectionable, socially undesirable or both.

We need to think very hard about ensuring that the legislation at least lets our successors—whoever may be Secretary of State at the time—consider that range of issues when approving something. Otherwise, the Secretary of State will say, “Oh well, this is technically okay, but I don’t like the look of what it is going to do by way of the kinds of decisions it is going to make,” and some adviser will tell that Secretary of State, “Sorry, Secretary of State, it is ultra vires for you to refuse this vehicle on the list just because it is going to mow down young people in preference to old people”—or something—“because you are only allowed to determine safety, not ethics.” It is quite important that we get that precise wording right. I am grateful to you for your tolerance, Sir Edward.

Matt Western (Warwick and Leamington) (Lab): I want to pick up the points made by the right hon. Gentleman. I was trying to think of parallels to try to understand this and imagine what it might be like in five or 10 years from now, and I guess I was likening it to the introduction of, say, cruise control and how that works with the insurance industry. If a driver instigates cruise control in an urban area and sets it at a speed that is in excess of the limit on that roadway, where would the responsibility and liability fall? The industry and

technologies are improving at a pace. As was said in the Chamber on Second Reading, it is difficult to imagine where we will be, but I imagine that essentially the liability should be with the driver. If the driver has introduced the cruise control or automated driving system—in whatever form that may take—that is their choice just as it is their choice to manoeuvre from one lane to another today, which might ultimately result in an accident.

Perhaps I am not appreciating the fine nuance of the debate, but I would have assumed that, ultimately, the liability has to be with the driver. In the event of an accident, the telematics would be able to provide data to the insurance industry to prove things one way or another.

Iain Stewart (Milton Keynes South) (Con): I rise simply to ask for a point of clarification from the Minister when he responds to the debate. I anticipate the answer to my question will be yes, but I would like to have it on the record. I anticipate that, as well as motor cars, the list of vehicles that the Secretary of State will compile and update will include lorries, buses, emergency services vehicles and other vehicles for which the driver would require an HGV licence or a public service vehicle licence. I would like clarification on that. For instance, I anticipate that, with technology, HGVs could be driven normally for a large part of a journey but then form part of some road train on a motorway with other similarly equipped vehicles. As I said, I would like clarification that the list will include those vehicles as well as private motor cars.

Mr Hayes: To paraphrase Bernard Shaw, I do not know whether I was born too early or born too late, but I do know that I was born to dare to dream of a future inspired—indeed shaped—by the past but not constrained by it; a future where we can achieve wonder. Part of that journey will be assisted by technological change. The technological change we are considering, as the Opposition spokesman said, could liberate many people who have not had easy access to private transport for a variety of reasons. That has extraordinary and wonderful prospects. As we consider the Bill, we should discuss it, as the shadow Minister did, in that context.

12.15 pm

However, the Bill presents challenges, which are highlighted by clause 1 and the amendments, as well as by the contributions that we have heard from Committee members on both sides. In essence, the challenge, as I explained briefly when I intervened on my right hon. Friend the Member for West Dorset, is to provide a legislative framework sufficient to give certainty, or at least a degree of certainty, to an industry engaged in research and development and further investment. On the other hand, being too specific in a highly dynamic area would be doing what he warned us against—trying to predict technological change, in the way that he described Governments doing in the past with unfortunate consequences.

That is our mission, and I am determined to do so in as convivial a spirit as possible; I am grateful to the hon. Member for Kingston upon Hull East for his generous remarks. Frankly, whoever was in government would face these challenges, and would be bringing a Bill of this kind to the House. It is perfectly appropriate that we should discuss it in as consensual a way as possible.

The job of the Opposition is to scrutinise such measures; indeed, it is the job of my right hon. and hon. colleagues to do so too. Those who have served on few Standing Committees and had little experience of legislation—there are some, who are newer Members of the House—will not have encountered a Minister quite like me. I am one of those rare creatures who are happy to listen to debate, hear suggestions and take them on board, be guided by them and concede where we have got it wrong. I am all the more so on issues such as this, because we are charting a difficult course, as I described.

The last time that we debated these matters—this is directly relevant to the amendments, Sir Edward, just in case you were thinking it might not be—we could not proceed with that Bill, because the inconvenience of a general election stopped us doing so. We considered the issues that we are beginning to debate now. They involve the creation of a list of automated vehicles to provide the public and the industry with the kind of clarity that I have described, and the relationship between those vehicles and new insurance provisions. Essentially, inasmuch as the Bill deals with autonomous vehicles, it does so in order to create a secure insurance market to allow the further developments that I mentioned.

The Bill suggests that the Secretary of State will create such a list to give clarity about insurance by applying the definition in clause 1(1)(a) and (b). We state that automated vehicles are those

“designed or adapted to be capable, in at least some circumstances or situations, of safely driving themselves.”

The answer to my hon. Friend the Member for Milton Keynes South is that that includes other vehicles. He mentioned HGVs; he will know that some R and D is being done on those kinds of vehicle. Given what we already know about the work being done in this area, private cars might not be the first vehicles to become automated. I am not making a prediction, but it could be vehicles of the kind that he described. The best example that I can think of is the shuttles at airports that one uses to get to the terminal. We do not think of them as vehicles in the same way that we think of a car that we might drive from our home, but they are vehicles. They travel on a pre-ordained route, rather like the vehicle that I saw when I went to Greenwich and that I mentioned in earlier consideration. That was a fully autonomous vehicle driving on a single road from two set points. That might be the kind of first steps that are taken as the technology develops.

I emphasise that the technology is in its early stages—not quite in its genesis; more in its infancy. The standards by which these vehicles will be approved for safe sale and use are still being discussed internationally, so another challenge for the Government is to ensure that we—as a nation, as a polity and as a Parliament—do not jump ahead of those international standards. That is another ball that we are juggling, if I may use those terms. The international standards are developing because the research and development of the kind that I have described are happening across the world. Many countries are engaged in it; indeed, many of the businesses are pan-national, so they work in a number of different countries. This will be discussed and is being planned for by the United Nations Economic Commission for Europe, in which the UK plays a leading role.

The standards are still being developed and will form the basis of the type approval process, which is well established in the motor industry. We already talk routinely about type approval; it has been a long-standing part of how the industry works. The critical thing is that for a vehicle to meet to that type approval process, rather like a non-automated vehicle now, to be sold for safe use on roads, it must meet those standards. The core requirement of safety is implicit in the development of those standards, which will be international.

Sir Oliver Letwin: My right hon. Friend mentions the core requirement of safety. What does he understand “safety” or “safely” to mean in this context, and what advice has he received about whether it can bear the burden of distinguishing between an ethically proper set of choices by artificial intelligence and an ethically improper set of choices?

Mr Hayes: That is a very big question indeed. It is the one that, in a sense, was first raised by the hon. Member for Eltham in the evidence session and on Second Reading, when he painted the picture of a scenario where a human being faces an ethical dilemma while driving. I will paraphrase the example for the sake of brevity: a child runs into the road and the driver has the choice of hitting the child or swerving and possibly causing a more catastrophic accident. That is a momentary judgment that any driver makes. In the end, it is a practical and ethical judgment, is it not? We could have a very long debate. My hon. Friend on my right, the Whip, may be my former Parliamentary Private Secretary, but he will not be entirely indulgent of me if I engaged in that very long debate, because of course one could extend it—

Clive Efford *rose*—

Mr Hayes: Ah! We are indeed going to extend it.

Clive Efford: Let me invite the Minister along that path a little. The right hon. Member for West Dorset raised an important question—I did not word it as succinctly as he did, but he has more experience of drafting legislation than I have, so that is no surprise. If morals or ethics are not specifically referred to in the legislation, a sharp-witted lawyer may later argue that the issue is not ethics or morals, but safety, and that it is therefore *ultra vires* to use the legislation to regulate that area of the technology. I urge the Minister to look at this issue again and consider amending the Bill to address it.

Mr Hayes: Let me try to answer the hon. Gentleman and my right hon. Friend the Member for West Dorset in two ways. First, I draw attention to something that Mr Wong said in evidence on Tuesday:

“May I point something out? I mentioned autonomous emergency braking. It has been demonstrated that the technology is improving all the time. Previously, autonomous emergency braking worked perfectly at 30 mph, which is urban speed, but it is becoming increasingly sophisticated. AEB can work well even at 50 mph. It would not surprise me if the technology improved in years to come”.—[*Official Report, Automated and Electric Vehicles Public Bill Committee*, 31 October 2017; c. 44, Q103.]

The technology is improving so rapidly and dramatically that in the scenario painted by the hon. Member for Eltham, an automated vehicle is likely to change lanes and—as in Mr Wong’s example—brake to ensure safety.

The representatives of the insurance industry stated in their evidence that the industry believes there will be fewer accidents, because the judgment of an autonomous vehicle will outpace that of a human being. I use the word “judgment” for technology with caution, as my right hon. Friend the Member for West Dorset used the word “ethics” with caution, but the judgment of the software driving the automated vehicle will be more acute and, in the end, safer. These machines are likely to be less prone to error than human beings, so there will be fewer accidents; the vehicles will be safer and therefore easier and cheaper to insure. We heard that point repeatedly in the evidence session. We can be confident that that is the direction of travel—I apologise for using that rather hackneyed phrase in this context—but we cannot be sure how quickly we will get there or exactly what it will look like. I would be a very bold man if I made such a prediction.

Sir Oliver Letwin: I, too, listened to Mr Wong and have re-read the part of his evidence that the Minister quotes from, but it is wholly irrelevant to our point. I thought it was extremely instructive that Mr Wong, who is clearly a very great technical expert, completely failed to understand the issue. The Germans have begun to understand it, but the Bill does not genuinely or seriously address it.

The Bill is drafted as if artificial intelligence were the same kind of thing as speed control. It is not, and that is a very important error underlying the Bill’s drafting. Speed control is a technical matter, and we could go much further with technical development and still be in the technical arena in which safety is the only question, because the ethical judgments are made exclusively by the human drivers. With artificial intelligence, as the hon. Member for Eltham rightly says, we are moving into a terrain in which the machine will make the kind of decisions that Parliaments and human beings make. These are questions not of safety, but of judgment about the right outcome under difficult circumstances.

I ask the Minister to go back to his Department and talk to its lawyers about whether jurisprudence will deliver to him or his successors the ability to refuse approval to a piece of artificial intelligence that, either directly or through its learning processes, will or could have the effect of producing totally dysfunctional anti-utilitarian results by making judgments that are technically perfectly safe but that just happen to take the view that, for example, wiping out a group of three-year-old schoolchildren is better than wiping out a 98-year-old crossing the road. That is a very difficult judgment for a human being to make, but it is the kind of judgment that Parliaments have to make, and I think that at the moment it is very clear in the Bill that it would not permit a Secretary of State to prevent type approval for a machine that was designed in such a way that there could be those very bizarre and undesirable results, and I am sure that that is not what the Department or the Minister wants to achieve.

12.30 pm

Mr Hayes: Let us not overestimate how far this Bill—I am being very particular about my words—intends to go. This Bill is about ensuring that victims of collisions caused by autonomous vehicles get quick, easy access to insurance compensation in line with conventional

processes. What we heard in the evidence and what we debated when the Bill was in its earlier incarnation was that it was important for the insurance industry, and therefore for the further development of this technology, that we were clear about that—there would be no difference, from the perspective of the person who owned the vehicle, in how they went about making a claim.

There is a much bigger debate, which will clearly have to be dealt with in legislation, in regulations, in type approval—in a whole range of other things—about some of the other matters that the hon. Member for Eltham and my right hon. Friend the Member for West Dorset have raised. If they are both right that we will get to a point at which the machine makes what is in effect an ethical judgment—I am trying to use words very carefully; it is very obviously the machine making ethical judgments, but I do appreciate the strangeness of it—clearly that will have to be taken into account at a future point in the legislative process. I do not think this Bill is the place to do it; I just do not think it can do it, because we do not yet know enough.

We are back to my first point, about the line we are trying to tread between what we can do now with certainty and what we might do in the future in a world in which we can as yet only imagine what might occur. If my right hon. Friend will permit me to say so, perhaps the Hegelian synthesis, where we might meet between what appears to be my thesis and his antithesis, is that this Bill is a starting point—a first step along, as I have said, a long road.

Sir Oliver Letwin: I am very grateful to my right hon. Friend for giving way. I entirely accept that this Bill is just the starting point, but I think he is missing the point that I am trying to make about what starting with this language—with just the word “safely” and no reference to wider considerations—will do to his successors.

There is no point in having the Secretary of State empowered to make a list unless Secretaries of State are actually going to make lists. There is no point in empowering them to make lists of automated vehicles unless those lists are going to relate to automated vehicles. Those automated vehicles will have artificial intelligence built into them; they cannot be automated otherwise. Therefore, the Secretary of State, who is making the list in the first place, which this Bill provides for—not some other Bill, but this Bill—will be constrained by the terms that the Bill sets for what basis they can use to make the list. That is why the shadow Minister has raised questions about the criteria, and why we are having this debate in the first place. Surely, therefore, we need to empower—I am not suggesting that we in any way oblige—later Secretaries of State to consider, *inter alia*, whether the machines that they are putting on the list are actually murderously safe or good and safe machines. At the moment, they can decide only whether it is a safe machine. If it happens to be safe in the sense in which Stalin could “safely” eliminate large sections of his population, the poor old Secretary of State would, as I construe it—the Minister has not given us any indication that he has had advice to the contrary—be prevented from—

The Chair: Order. The right hon. Gentleman is being carried away by his own verbosity. Stalin—

Sir Oliver Letwin: No, no, no.

The Chair: I think he is. We have started to wander more and more away from these quite narrowly defined amendments. I know that the Minister will get us back on track.

Mr Hayes: I am, as ever, guided by you, Sir Edward—having already cited your sagacity, I could hardly be anything other. I am delighted that we managed to get Stalin and Hegel into the same exchange. You will not get that in many Committees, Sir Edward. I am thinking about where we might end up, but I am prepared to live with that. It is important for safety, which in the end is a baseline factor, as I think my right hon. Friend will agree. However, there is a point about ethics. The advice I have received is that no vehicles that are not considered safe and ethical will be allowed on the market and therefore are not for consideration on the list.

Sir Oliver Letwin: Safe and—

Mr Hayes: Safe and ethical. I have received advice; I like taking advice and not taking it. Before I make that my definitive position, I want to reflect a bit. If we were to say no to the advice that was not safe and ethical, I want to be absolutely clear what ethical means. We know what safe means. We can draw on existing practice in respect of type approval. We know what measures of safety are about, but when we get to measures of ethics, we are in an altogether more challenging area. That is why I will reflect a bit on the characteristics. This is an incredibly interesting debate, by the way, and very useful.

Karl Turner: Will the right hon. Gentleman give way?

Mr Hayes: I will give way briefly, but I must make progress or I will get into real trouble.

Karl Turner: I am obliged to the Minister for giving way. Will he concede that the right hon. Member for West Dorset and my hon. Friend the Member for Eltham are absolutely right that there is huge potential for legal argument about what is actually safe driving? There will be a debate around that that could end in litigation. No?

Mr Hayes: Yes, I agree. I think that is precisely right. As I said a moment ago, that is the significance of the debate. We are now at one in that there needs to be a list and that needs to be qualified. We have made some changes, which I will deal with in a second, since we first debated these matters. In his first contribution to our consideration, which now seems a long time ago, the hon. Gentleman spoke of consultation. I do not want to constrain the identification process or be too precise about the criteria, for the very reason that we have all been discussing, but it is right that a consultation is an implicit part of the continuing consideration of this. I am happy to say that that has to be part of it. As the technology develops, given what I have said about dynamism, there would have to be ongoing communication about the change in character of the technology and what that meant.

The safe functioning criteria are more straightforward. This is about a marriage between software and the machine. The machinery certainly needs to be safe. We drive machines now with internal combustion engines that are not fundamentally different from their early ancestors. So we know that the machine needs to be

safe. The existing provisions in the Bill are clear that the list can comprise at present only vehicles that can be legally used on the roads. Having reflected briefly, I will reflect more—I am in reflective mode, as the Committee can tell. Perhaps it is about what we do in regulations. There might be an opportunity to qualify or clarify through regulation how the list develops.

Matt Western: Will the Minister give way?

Mr Hayes: I will give way to the hon. Gentleman in one second. My right hon. Friend the Member for West Dorset made the point that if we are too narrow in what we put in this legislation, even though it is a first step on the road, it may make the second, third or fourth step more difficult. That is the essence of his point, which he came to in the end. Either he focused his argument more precisely at the end or I was not bright enough to grasp it at an earlier stage of the argument, but that seems to be the essence of what he was saying. That is the bit that I want to think more about. I think that we are all happy that this is not the end of this process, but we must make the beginning of the process fit for purpose. That is essentially where we are.

Let me try to get through some more of my pre-prepared notes rather than extemporising, as is necessary when we have proper dialogue and scrutiny.

The Chair: Yes, the Minister was in danger of going around in circles, so he should get back to the script.

Mr Hayes: I will not go around in circles; I will come to a brief conclusion.

As I said, I am not sure that it would be appropriate to be too precise about the criteria. The only scope that the Secretary of State will have to list a vehicle is by determining whether it meets the safety definition. If it does, it will be included on the list; if it does not, it will not. There is no discretion to make a decision outside those parameters; the power is merely administrative and is not a discretionary legislative power. That is so we can be clear about why vehicles need to be on the list.

The defined vehicles will not be covered by our current insurance framework and will therefore need new, specific insurance products. That is the point I was making about the limits to what we are trying to do now and the essence of why they matter. This is about allowing the further development of appropriate insurance products that are not out there now, because if they are not out there in the future that will inevitably limit how far we go with the further development of vehicles.

I promised to give way to the hon. Member for Warwick and Leamington and I have not done so. That was very discourteous of me, so I do so now.

Matt Western: I thank the Minister. It was not a discourtesy; I was waiting and listening. I want to pick up the regulatory framework and where that takes us. The interpretation of safety is all about the criteria and what is set by, say, the Transport Research Laboratory. Let us look, for example, at the standard for an acceptable braking system. It is what the Secretary of State, through the Department for Transport, ultimately determines to be the criterion for, say, acceptable responsiveness—whether that is a swerving action by a vehicle or a braking

system—that gets measured and therefore determines whether a vehicle is acceptable for inclusion on the list. We are obviously at the first stage, but the next stage will be determining those criteria for deeming a vehicle acceptable for UK roads. I hope that that is helpful; I imagine that a very technical regulatory framework will need to be determined.

Mr Hayes: Yes, I agree. That is precisely why we should develop criteria down the line in a regulatory way, as the hon. Gentleman suggests, and why we will need to do so mindful of the international standards that I described and the ongoing debate that is taking place internationally through well-recognised bodies. I agree. This is a highly dynamic and dramatic series of changes, if I might say so.

My final point is that the character of the amendments and of our debate is about the Secretary of State's interpretive powers. We have to be careful about extending the interpretive scope of this part of the Secretary of State's responsibilities. This is yet another line to walk and not to cross. The criteria for inclusion on the list need to be sufficiently clear as not to allow any doubt in the insurance market about precisely what kind of vehicle might be on the list and therefore what kind of vehicle might or might not be insured. I am therefore doubtful about extending the interpretive scope.

We need to be clear which vehicles and which software can safely be operated in automated mode. The Secretary of State will therefore be able to transpose approved vehicles on to the list to ensure that our domestic insurance framework is based on and clear about which vehicles need which insurance products. It would not be appropriate to legislate at this early stage, as amendment 8 and new clause 11 suggest, to set an approval procedure or safety criteria until we know what the international standards are. The hon. Member for Warwick and Leamington is right; we will almost certainly need to do that further down the line as those international standards become clearer. Whether that is in other legislation or more likely in regulation—that is how I would like to go—is no doubt something we will debate over the course of the coming days.

In essence, I return to my core argument: the Bill is a starting point to creating greater clarity. It is not by any means the end of what I hope—I return to my very early words—will be a wonderful story.

12.45 pm

Karl Turner: I accept that the Bill is the mechanism for getting the ball rolling, but the more I listen to the debate, the more I am persuaded that we need something on the face of the Bill to ensure that there is consultation and criteria.

Mr Hayes: I always try to avoid contumely—I think that is a well-known fact about me—but I have said I will reflect on what the hon. Gentleman and my right hon. Friend the Member for West Dorset said. I have said that consultation is an implicit part of this process. I implore the hon. Gentleman to avoid contumely and withdraw his amendment.

Karl Turner: I will not withdraw the amendment. With your leave, Sir Edward, I will press it to a Division.

Question put, That the amendment be made.

The Committee divided: Ayes 6, Noes 9.

Division No. 1]

AYES

Brown, Alan	Foxcroft, Vicky
Duffield, Rosie	Turner, Karl
Efford, Clive	Western, Matt

NOES

Argar, Edward	Mann, Scott
Hayes, rh Mr John	Stephenson, Andrew
Kerr, Stephen	Stewart, Iain
Knight, rh Sir Greg	Tracey, Craig
Letwin, rh Sir Oliver	

Question accordingly negatived.

Clause 1 ordered to stand part of the Bill.

Clause 2

LIABILITY OF INSURERS ETC WHERE ACCIDENT CAUSED BY AUTOMATED VEHICLE

Clive Efford: I beg to move amendment 9, in clause 2, page 1, line 22, at end insert—

“or by an automated vehicle when transitioning between driving itself and being driven by a person,”

This amendment would ensure that the liability for accidents caused by an automated vehicle that is transitioning between driving itself and being driven by a person would be the same as the liability for accidents caused by an automated vehicle when driving itself.

The Chair: With this it will be convenient to discuss amendment 10, in clause 2, page 2, line 6, at end insert—

“or by an automated vehicle when transitioning between driving itself and being driven by a person,”

This amendment would ensure that the liability for accidents caused by an automated vehicle that is transitioning between driving itself and being driven by a person would be the same as the liability for accidents caused by an automated vehicle when driving itself.

Clive Efford: I hope we will not take as long on these two amendments as we took on the previous group, although it was a fascinating discussion. The amendments follow on from that, because they relate to the transition period and the third of the five tiers that go from driver-assisted systems to full automation. Tier 3 is where the vehicle can transition from being fully automated to being driven by the driver, and vice versa.

Various pieces of research into the issue have come to different conclusions. In the evidence sessions, we heard that Audi had carried out some research at different speeds and come to the conclusion that there should be a minimum of 10 seconds in that transition period. The Venturer research came to slightly different conclusions, but all the research points to the fact that this is a problematic area in automated vehicle technology. It can take a deal of time for a driver to become alert. Mr Wong described to us various alarms that alert the driver to a vehicle request for the driver to take back control of the car; if those various alarms do not alert the driver, the vehicle will then slowly come to a halt. I am sure that we can all imagine the sort of disruption that could be caused if that happened on a motorway. He even described how the car prepared for an accident

[Clive Efford]

by tightening the driver's seat belt just before the vehicle came to a halt, in case the driver had passed out or was so fast asleep that the alarms did not wake them up. There are various scenarios involving the transition that cause alarm.

Mr Gooding of the RAC Foundation felt that we should not even entertain tier 3 because it is unsafe and does not make any sense, and because the legislation is about moving straight to tiers 4 and 5. Clearly, if people giving us evidence are saying that, I suggest to the Minister that it should cause the Government some alarm, and that perhaps we should be legislating to say that we do not want to allow this on our roads. There are issues being raised about the clear dangers of tier 3 transition.

Sir Oliver Letwin: I, too, note what was said about tier 3, but I hope that the hon. Gentleman is not underplaying his own point. What he referred to in the transition phase also applies to tier 4. It is only at tier 5 that it disappears.

Clive Efford: My understanding of tier 4, as Mr Wong said in his evidence, is that it is only at tier 4 that the human is removed from the equation; I think that those were his exact words. I must admit that that seems to be a contradiction. Tier 5, as I understand it, is a fully automated vehicle with no steering wheel, totally under the control of technology. One wonders what tier 4 is. If tier 3 is the transition between human and vehicle and tier 5 is a fully automated vehicle with no steering wheel whatever, what is tier 4? Is it a lesser tier 5 or a greater tier 3? I will give way to the Minister, who is going to enlighten us.

Mr Hayes: I suggest that I drop a note to the Committee setting out what each tier means; otherwise, we will have this debate time and again. I can anticipate Members across the Committee querying it. I have asked my officials already.

Clive Efford: That would be helpful. I have looked at it, but as has been demonstrated in our exchanges, the difference between tier 5 and tier 4 is not entirely clear. From the descriptions of the people who gave evidence to us, in tier 4, the human is removed entirely from the equation.

We need to consider this issue. The evidence that I read said that the Venturer experiment at the Bristol testing centre discovered that drivers, when they first took over, tended to be over-cautious and drive at slower rates, which could increase congestion. There was also the potential for danger in vehicles suddenly slowing down, and Mr Gooding said in his answers to our questions that he felt that that issue was more important than congestion.

There are some important considerations raised by the issue of transition, particularly in tier 3. We asked witnesses, "When will the vehicle decide whether it is safe for the vehicle to drive or whether the vehicle should be handed back to the human driver?" They said that it depended on road conditions. That suggests that it will happen in the same locations on our roads: for

instance, as vehicles leave motorways and enter more built-up areas, where there are more potential hazards and dangers for vehicles, it is likely that the vehicles will transition back to being driven by the driver. If that will happen regularly in the same location, it could create accident black spots. We could create a considerable new hazard on our roads.

Sir Oliver Letwin: We eagerly await the Minister's note, but due to the wonders of modern technology, one can look it up on the web. Level 4 is clearly described as fully autonomous and

"designed to perform all safety-critical driving functions and monitor roadway conditions for an entire trip."

However,

"it's important to note that this is limited to the 'operational design domain' of the vehicle—meaning it does not cover every driving scenario."

I hope that the hon. Gentleman will agree that the transition question arises in relation to level 4 when vehicles move from one driving scenario to another.

Clive Efford: I accept that entirely and agree. It comes back to my point that it is likely to happen regularly in similar locations, and that patterns of behaviour will occur in particular spots where transition occurs because the technology requires it. We need to be aware of that. The testing is telling us that that is happening, but we are not taking it into consideration in the Bill, as we should.

I suggest to the Minister that we need to take that away and consider it. Safety must be the aspect most prevalent in our minds. There is also the moral or ethical issue of driver autonomy: will the driver be in charge of the vehicle, or will the technology be in charge of the driver? In the debate on previous amendments, he said that the technology is superior; he did not use that word, but he said that it is safer than a human in the event of an accident, even suggesting that a vehicle would make better or quicker choices than a human. That points us down a road, if Members will pardon the pun, of having roads operated in the way that our railways or underground service are controlled. Why not have fully automated vehicles of which drivers do not have control at all?

Mr Hayes: Let me be clear about that. We will not have time to complete our consideration of this group of amendments, so I feel that intervening might be helpful. What I said was that I drew that conclusion from the evidence that we received. The insurance industry and other witnesses said that they thought that the vehicles would be safer, and that insurance premiums might decrease over time; they said so because they believe that autonomy will make vehicles safer. It is implicit that they gauge the autonomous driving mode to be safer.

Clive Efford: My experience has been that many people who come to give evidence to us as MPs assure us that a technological advance will deliver X, Y and Z, take us far forward and lead us to a promised land where things are safer and much improved, yet we find that due to the law of hidden consequences, we face a whole different set of scenarios. The one that I am

pointing to here is that the transition between driver and technology is already throwing up potential hazards on our roads, even before we have let the vehicles on our roads. We know that the issue exists, because it has shown up in the testing. Therefore, we should legislate for it. I have asked the Minister to take on board those arguments, and I can see that the Whip is itching to get to his feet.

Ordered, That the debate be now adjourned.—*Andrew Stephenson.*

1 pm

Adjourned till this day at Two o'clock.

