



Changing what it means to be blind

January 29, 2015

Dear GRB Delegate:

Concerns Over QTRV Draft Regulation

The World Blind Union (WBU) has major concerns that the current draft document fails to address the most vital needs of the vulnerable road user (VRU).

The World Blind Union (WBU) has been closely involved in the development of a minimum sound standard for electric and hybrid electric vehicles. While I am not a sound engineer, I am increasingly concerned that the Informal Working Group is moving in a dangerous direction as it concerns the sound standard. I expressed many of my concerns at the Brussels meeting in late October and John Paré reiterated these concerns in Tokyo in December. I am hoping that you will join with the blind of the world in pushing for a minimum sound standard that is focused, first and foremost, on the safety of the pedestrian and not on general preconceptions that sound is annoying and to be kept to its lowest possible level.

I addressed my major concerns at the Brussels meeting when I offered comments in response to the Position Summary prepared by the Comité de liaison européen des fabricants d'équipements et de pièces automobiles (CLEPA) related to the development of an effective Acoustic Vehicle Alerting System (AVAS).

It is widely agreed that an AVAS is needed to alert pedestrians to the presence of electric drive vehicles such as hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), and all electric vehicles (EVs) travelling at low speeds. An AVAS is a necessary safety feature since vehicles operating in all electric mode produce less noise than traditional internal combustion engines (ICE) making it more difficult for pedestrians, including blind and visually-impaired individuals and other vulnerable road users (VRUs), to be aware of the presence of these vehicles.



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As you know, the charge given to the Informal Working Group (IWG) was to develop a Global Technical Regulation (GTR) that defines the purpose and function of an AVAS. Specifically, the Terms of Reference, Section B, establishes four criteria for an AVAS:

“... to aid visually-impaired and other vulnerable pedestrians in detecting the presence, direction, location, and operation of those vehicles.”

Our primary concern is that these four criteria, presence, direction, location and operation of a hybrid electric or electric vehicle, must be taken together, that is, they must be viewed as a whole; and an AVAS must satisfy all four criteria.

We believe:

- o The AVAS sound must be detectable and locatable;
- o The AVAS must be on while the vehicle is stationary;
- o The GTR must require a sufficient number of one-third octaves to maximize the detection, location, and direction of the vehicle;
- o The sound level for the AVAS should be the same as the sound level proposed in the National Highway Traffic Safety Administration (NHTSA) Notice of Proposed Rulemaking (NPRM); and
- o The GTR must prohibit a driver controlled on/off or pause switch.

1. DETECTABILITY VS. LOCATABILITY

The Japanese guidelines detail two high risk scenarios:

- o “Exiting an alley;” and
- o “Road where both pedestrians and vehicles are present.”

These high risk scenarios identify the danger posed by what we call “right on red,” right-hand turns for countries that drive on the right and left-hand turns for countries that drive on the left side of the road; and the potential danger to pedestrians crossing a road posed by a vehicle approaching from either the left or the right.



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While we agree that these are high risk scenarios, they are by no means the only high risk conditions VRUs encounter. In fact the two scenarios detailed in the Japanese Guidelines are less high risk than scenarios in which the potential danger to the pedestrian is far less predictable. Passing an alley and crossing a road are situations known to be potentially dangerous. Pedestrians know that cars move on streets and alleys and exercise caution (consciously or subconsciously) when crossing them.

In our view, a greater risk exists in situations in which vehicle behavior is less predictable, such as walking through a parking lot or passing behind a vehicle that is backing out of a parking space. While the pedestrian knows that cars are present, the pedestrian does not know whether the vehicle is active or inactive without an alert sound (internal combustion engine (ICE) or AVAS). In addition, a pedestrian walking through a parking lot may encounter a vehicle moving in front or behind the pedestrian or on either side. When crossing a road or alley, the potential of encountering a moving vehicle is limited to a vehicle passing on a defined road surface in one direction or the other.

For this reason we believe that the Japanese Automobile Manufacturers Association and Organisation Internationale des Constructeurs d'Automobiles (OICA) Guidelines incorrectly presume that the danger to VRUs posed by quiet vehicles is limited to situations in which vehicles are moving on defined road surfaces and in predictable ways. Consequently, the Japanese/OICA Guidelines erroneously conclude that the AVAS needs only to be detectable and does not need to provide information about the location and direction of a vehicle's movement.

This view has led to the conclusion that a distinction must be made between sound that is desirable from sound that is necessary. Throughout the discussions, some have argued that the GTR must be limited to sound that is required for safety and must not include sound that may simply provide some navigational benefit to blind and visually-impaired pedestrians. We have heard repeatedly that "no stationary car has ever harmed anyone." The implication is that awareness of the presence of a quiet vehicle and its potential for immediate movement is unrelated to safety. The WBU rejects this position and believes that the NHTSA data make clear that VRUs are at risk from quiet vehicles that are turned on and may begin moving at any time.

To date the only data presented that link quiet vehicles to an increased risk to pedestrians are contained in a report from NHTSA that was published in September 2009, Incidence of Pedestrian and Bicyclist Crashes by Hybrid Electric Passenger Vehicles. NHTSA reviewed data



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from the nine U.S. states that record details of all accidents by type, location and vehicle identification number. To quote NHTSA: “The results of the crash data analysis show that hybrid vehicles (HVs) are two times more likely than ICE vehicles to be in a pedestrian crash where the vehicle is backing out, slowing/stopping, starting in traffic, and entering or leaving a parking space/driveway.”

The NHTSA report shows that pedestrians are at risk in a variety of situations beyond the two high risk scenarios detailed in the Japanese Guidelines. Pedestrian accidents were not limited to cars exiting alleys or driving on defined roads. Pedestrian accidents occurred in situations that included vehicles moving from left to right, front to rear, and so on. Pedestrians were injured by quiet cars that were slowing down or stopping, starting to move, and backing out of parking spots. From this data we conclude that it is essential that VRUs be able to identify the location of a vehicle, the direction of movement and its potential movement, rather than simply being aware of the presence of the vehicle—locatable vs. detectable; hence the requirement in the Terms of Reference: “... to aid visually-impaired and other vulnerable pedestrians in detecting the presence, direction, location, and operation of those vehicles.”

2. SOUND AT STATIONARY

The WBU is deeply concerned that section six of the draft does not include a specific requirement for hybrid electric and electric vehicles to make a sound when operational, yet stationary. The WBU has repeatedly explained the importance of requiring that quiet vehicles make an alert sound while stopped at a traffic light or in other situations in which the vehicle is stopped, but able to move at any moment. This is true in predictable and less predictable situations. For example, if a driver is preparing to make a right turn at a red light, the driver is looking to the left to make sure that the near lane is clear of oncoming traffic. If a blind pedestrian is unaware of the presence of the vehicle, he or she may step out in front of the vehicle just as the driver begins his or her turn. It is the unexpected actions of pedestrians that increase the likelihood of an accident. The driver would not expect that a pedestrian would step out in front of a car that has pulled forward (perhaps into the crosswalk) and is clearly intending to make a right turn as soon as the near lane is clear. Awareness of the presence of a vehicle that may move at any moment is essential to making safe go/no-go decisions and for safe navigation passing in front of stationary vehicles.



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During the course of QRTV various research studies identified the need for sound at stationary; e.g. the University of Duisburg-Essen paper QRTV-09-02 research results stated; “Special problem for blinds at crossings without signals, because standing cars (BEV, HEV or ICE with automatic start/stop) cannot be heard.” The WBU and the National Federation of the Blind join with the German Federation of the Blind and Partially Sighted (DBSV) in its call for sound at stationary. At the GTR QRTV-02-04e meeting in Berlin, Germany, held December 5 – 7, 2012, Hans Kaltwasser stated that: “DBSV says yes to sound at stationary, silent cars need to produce a sound to alert blind pedestrians of their presence and enable them to make their decision to cross.”

Mr. Kaltwasser went on to say: “This also applies to vehicles with start/stop technology. These vehicles are as silent as electric or hybrid cars and need to produce an alerting sound.”

The position of the WBU and the blind of the world is rational and balanced. The WBU believes that quiet vehicles must make an alert sound at stationary to ensure pedestrian safety. At the same time, the WBU does not object to a reasonable level of attenuation for stationary vehicles.

3. SOUND CONTENT

While we are not acoustic experts, we know that an AVAS must be locatable, not simply detectable. We have been told that there are other ways of insuring that an alert sound is locatable and will enable the pedestrian to judge the direction of movement other than by using wide-frequency range broadband. Our concern is that the Informal Working Group has made these claims, but has not provided the scientific support. We know that multiple one-third octaves or broadband, satisfies the critical need for blind and visually-impaired individuals’ ability to make literally life and death decisions; and we are not closed to the possibility of other solutions. Nevertheless, we do believe that any sound specification must be demonstrated to be detectable and locatable or it will not provide the needed safety for blind and other VRUs.

From the report of experts, we understand that, given enough time and, ideally visual cues, all sound is locatable; but, of course, some sounds are distinctly more locatable than others; and, more to the point, time is an essential factor for a blind person or other VRU to make a safe judgment about whether to move and in which direction, and the judgment must not be dependent on visual cues.



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Strong tones, such as those used by Japanese car manufacturers, make the sound source difficult, if not impossible, to locate. At the same time, low frequency sound is omnidirectional and very difficult to locate.

By contrast, multiple one-third octaves or broadband provides blind people and other VRUs with the ability to detect and locate the sound source. As described in one of Brigade's papers, even sound fields eliminate tonal confusion. We also know that higher frequencies greatly increase front-rear localization. For this reason, the WBU believes that the GTR must require a sufficient number of one third octaves to maximize the detection, location, and direction of the vehicle.

It may have been an OICA presentation in which subjects were positioned facing a row of parked cars. The subjects were asked to identify by sound which car moved. The conclusion of the report was that a single tone gave sufficient information for the subjects to identify the location of a moving car. The WBU believes that this test is flawed in two important ways. First, the parked cars were located in a defined location, that is, in front of the subjects. The subjects knew that the cars were arranged in a row from left to right, but not behind the subjects. In other words, the subjects had to identify the location of the cars in a limited field (perhaps seventy degrees from left to right), rather than the movement of the cars in any direction (three-hundred and sixty degrees), as occurs when traveling through a parking lot.

The second problem with the OICA test is the assumption that the ability to identify the location of a moving car within a second or two is sufficient to enable the pedestrian to make reasonable decisions about where and when to move. A vehicle averaging two miles-per-hour (MPH) (three kilometers-per-hour (KPH)) will travel three feet (point eight meters) per second. If a VRU takes two seconds to identify the location of a car, the car may have moved six feet or more before the VRU has been able to make a decision about what to do and take appropriate action. For a blind person or other VRU, this affects life or death decisions.

When blind people walk through a parking lot or any mixed pedestrian vehicle area and hear an AVAS, they need to know immediately the location of the vehicle and the direction of its movement. Not knowing, or taking a second or two, to identify the location and direction of movement of the vehicle, means that the blind person cannot make a safe decision about whether to move forward, backward or whether to stand still.



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4. SOUND LEVEL: SUFFICIENT FOR SAFE GO/NO-GO DECISIONS

The WBU is staggered and profoundly disappointed by the six a-weighted decibels (dBA) difference between the draft regulation and the NHTSA proposal contained in its Notice of Proposed Rulemaking (NPRM). The members of the IWG have offered no explanation of how the proposed minimum sound levels were developed. Six dBA is a striking difference between the draft and the NHTSA NPRM, and without compelling evidence to show how the proposed level was derived, must be relinquished in favor of the NHTSA NPRM level.

We have been told that the AVAS does not need to enable the pedestrian to make a safe decision about crossing; it only needs to be sufficient to afford the driver time to stop for a pedestrian who steps out in front of the vehicle. We understand that that was the basis of the scientific measurement used in developing a minimum sound standard, that is, a baseline for establishing a minimum, not maximum, sound level. The WBU believes that AVAS must produce a level of sound that is loud enough to enable blind pedestrians to make safe go/no-go decisions. It is unacceptable to establish the loudness of AVAS based on an assumption of driver alertness. In other words, the WBU rejects the premise that the sound should be sufficient to insure that, if a pedestrian steps into the street in front of a quiet vehicle, the driver will have sufficient time to react and stop. The WBU strongly believes that AVAS must ensure that blind pedestrians have enough warning of the approach of a quiet vehicle to be able to make safe go/no-go decisions. Said bluntly, it is both arrogant and irresponsible to base the sound level of AVAS on the ability of a driver to stop before striking a pedestrian. It is insulting and unreasonable to ask VRUs to depend on drivers who may or may not be paying attention to guarantee their safety. In an earlier quiet road transport vehicles (QRTV) meeting, the statement was made that drivers are required by law to watch for pedestrians. They are also required to stay within the prescribed speed limit, obey traffic signals, wear their seatbelts, refrain from talking on mobile phones and a whole host of other obligations; yet accidents happen, and it is unreasonable to ask blind pedestrians to rely on the alertness of drivers to ensure their safety. All pedestrians, including VRUs, must have the information they need to make safe decisions; it is common sense, good public policy and a fundamental human right.

The German Federation of the Blind and Partially Sighted (DBSV) expressed this sentiment when it said:



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“Blind people have a right to be out in the streets and move around independently. All legislative work should take into account that this right is a human right enshrined in the Convention of Rights of Disabled People (CRDP). The CRDP was adopted by the United Nations General Assembly in 2007 and has been ratified by many state parties in the world.”

5. DRIVER OPERATED ON/OFF OR PAUSE SWITCH

The WBU strongly objects to a driver operated on/off or pause switch. There is no data to support the efficacy of an on/off or pause switch for the AVAS. The only rationale that has been offered is that the driver should be able to shut off the AVAS in situations in which it is not needed or when the AVAS is annoying to the driver or others. Examples are when a vehicle is on a highway in traffic or when a driver is coming home late at night and there are no pedestrians on the street.

The WBU and other organizations of blind people, including the DBSV unanimously oppose the inclusion of a driver controlled on/off or pause switch. DBSV paper bullet No. 4 "No On/off switch.”

The inclusion of an on/off or pause switch is based on two false assumptions. First, it assumes that the driver knows when the AVAS can be safely turned off and will only turn the device off when it is not needed, and it assumes that the AVAS sound will be annoying or objectionable. Neither assumption is supported either by logic or by data.

What training will drivers use to determine that the AVAS is not needed? On what basis can it be assured that the AVAS will not be turned off in situations in which it is needed? If we could rely on drivers always to make safe judgments, we would have fewer accidents.

The second argument in support of an on/off or pause switch is the more troubling of the two. It is based on the argument that the driver should be able to turn off the device when the AVAS sound is annoying to the driver or others. If we assume that the AVAS sound will be annoying, then the driver will be encouraged to turn it off as frequently and for as long a period as possible. How will the driver's wish to turn off an annoying sound be balanced with the need of VRUs for an alert sound? The obvious answer is that there is no way to balance these competing needs. Annoyance cannot be balanced with safety. The best way to ensure VRU safety is to implement



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a GTR that will give scope to develop a sound acceptable to the public and to the vehicle occupants that alerts VRUs to the presence, location, recognition and approach of a quiet vehicle.

The inclusion of an on/off or pause switch will inevitably lead to avoidable pedestrian accidents. There is no way to ensure that drivers will not make poor or uninformed decisions about when the AVAS is needed and when it is not, particularly if the driver finds the sound to be annoying. The cost of death or serious injury is not a reasonable trade-off for driver comfort. A demonstration to the Working Group in Brussels last year revealed a prototype AVAS fitted to an EV. The consensus was unanimous that the sound was acceptable and that it was inaudible to the driver (with closed windows).

Procedural Matter

Finally, as discussed at the Brussels meeting, the terms of reference state: The IWG for QRTV shall invite, consult with and consider the input of safety experts from the Global Road Safety Partnership (GRSP), Working Party on Braking and Running Gear (GRRF), and Working Party on General Safety (GRSG). To date, no safety expert from GRSG has been invited to participate in the drafting of the GTR. This must be remedied immediately to ensure a fair and open process and to guarantee that the regulation achieves its objective of providing for the safety of all pedestrians, including blind people and other VRUs.

Thank you for considering our views. We need you strongly to support a minimum sound standard that legitimately meets the goal of providing blind people and other VRUs with a reasonable level of safety as they travel the roads and thoroughfares.

Sincerely yours,

A handwritten signature in black ink, reading "Fredric K. Schroeder".

Fredric K. Schroeder, Ph.D.
First Vice President
World Blind Union