

A Study on Approach Audible System for Hybrid Vehicles and Electric vehicles - Second Report -

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JASIC, JAPAN

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1. Review of Previous Presentation from Japan at 49th GRB

- The previous study was conducted because of the concern that the increasing number of hybrid vehicles could cause accidents due to their quietness, such as hitting pedestrians who are not aware of their approach.
- Since the noise of HVs in motor mode and EVs at low speed (<15km/h) is difficult to be perceived because it is too quiet, the vehicle was experimentally driven while playing sample sounds to study its perception and acceptability by pedestrians.

HVs : Hybrid Vehicles

EVs : Electric Vehicles

1. Review of Previous Presentation from Japan at 49th GRB

- Some sample sounds have higher acceptability than GV noise even at equivalent noise level (L_{Aeq}) lower than GV noise by about 10 dB(A) and have almost the same perception level as GV noise. ($L_{Aeq}=50\text{dB(A)}$ at 2 m)
- It is desirable for the vehicle approach audible sound that the sound is obviously coming from vehicles or that is widely promoted as a such sound.

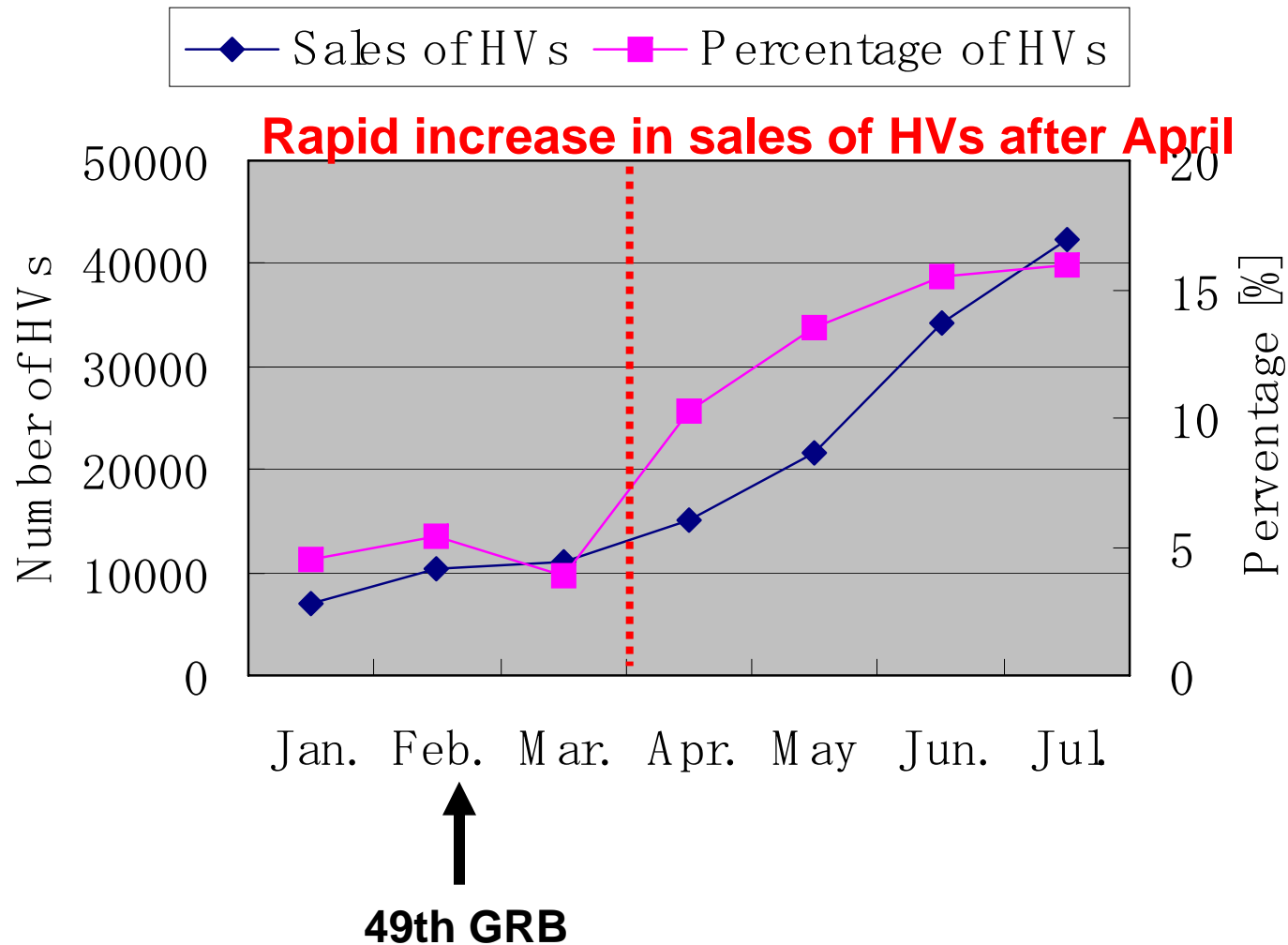
GV : general Gasoline engine vehicle

2. Changes in the Situation in Japan (1)

- In Japan, the number of HVs/EVs is increasing rapidly after this April, because of
 - (1) The government campaign to help promote low-emission vehicles such as HVs and EVs has started in April; i.e., tax relief and subsidy programs.
 - (2) The effect of car manufacturers' sales campaigns for new models of Prius, etc.
- As a result, the petitions for actions to be taken by the government regarding these vehicles is increasing from vehicle users, Japan federation of the blind, etc. and will further increase.
- This issue was even discussed at the Diet.
- It is required immediately by the social demand to take measures with HVs/EVs as soon as possible.

2. Changes in the Situation in Japan (2)

Monthly Sales of HVs in 2009



2. Changes in the Situation in Japan (3)

- It was decided to set up a study committee at Ministry of Land, Infrastructure, Transport and Tourism (MLIT) consisting of academic experts, a representative of Japan federation of the blind, Japan Automobile Manufacturers Association (JAMA), Japan Automobile Importers Association (JAIA), etc. to discuss the measures to be taken.
- It is necessary to reach the conclusions at the study committee by the end of this year and then implement the specific measures without delay.
- Japan will report progress of discussions in the study committee to GRB.

3. Issues Discussed at Study Committee

- What measures are necessary for HVs?
 - (1) Situations where the measures are needed;
 - (2) Type and volume of the sound;
 - (3) Means to produce the sound;
 - (4) Method for implementing the measures (mandatory or voluntary?)

For example, the committee members will discuss, if an audible sound is used, whether the sound should be on permanently or only when the driver judges it necessary.

4. Status of Discussion at Study Committee

- 1st meeting - 2 July 2009

The current status of situations, including traffic accident data and prediction for increases in the number of HVs, etc. were reported.

Opinions exchanged regarding the future actions to be taken.

- 2nd meeting - 5 August 2009

(1) Workshop held where committee members and visually-impaired people were invited to hear the noise of running HVs/EVs.

(2) At the workshop, participants were also asked to hear various sample sounds for approach audible system from running HVs/EVs, such as chimes, melodies, and simulated engine sounds.

(3) Opinions exchanged regarding the course of future actions to be taken.

5. Scenes from Workshop

* Photos of the workshop



Participants were asked to raise a hand when they noticed the vehicle passing by.

HV

Driven at low speed of about 10 km/h

EV



Workshop was held publicly; Reporters from major TV stations and newspapers came, showing the society's heightened concerns.

5. Scenes from Workshop

The objective of this workshop was to have the participants hear various sample sounds that had been discussed and see the latest HVs and EVs.

The comments obtained from them will not be the conclusion of the study; rather, it will be used merely as reference in future discussions.

The comments from visually-impaired people:









- (1) Where is the chime or steady sound coming from? Also, the behavior of the vehicle was a little difficult to grasp.
- (2) Simulated engine sounds are good because we are used to hearing the engine sound in daily life.
- (3) In discussing the selection of the sound, it is necessary to determine whether the sound clearly indicates it is coming from the vehicle without pedestrians' having prior knowledge from the government's PR activities, or whether pedestrians can tell from the sound if the vehicle is approaching or going away from them.
- (4) The volume of the sound should be decided based on the common sense.

6. Schedule

- 3rd meeting - Autumn of 2009
Proposed measures necessary for HVs to be discussed
- Public comments - Autumn of 2009 (after 3rd meeting)
Public comments to be called for on the proposed measures.
- 4th meeting - End of 2009
Wrap-up of the discussions, taking into account the discussion in GRB and considering further measures.
- After 4th meeting
Based on the results of discussions by the study committee, the specific measures will be implemented by MLIT.




7. Sample Sounds for Approaching HVs/EVs

- Chimes and melodies (sample sounds presented at 49th GRB)

No.	Sound type	Remarks	Frequency
(1)	Non-steady sound	Existing sound (Already in use in Japan)	
(1)-2	Non-steady sound	Modified sound (1) by a car manufacture	
(2)	Non-steady sound	Created sound	
(3)	Non-steady sound	Created sound	
(4)	Steady sound	Created sound	
(5)	Steady sound	Created sound	
(6)	Steady sound	Created sound	
(7)	Steady sound	Measured engine sound	

7. Sample Sounds for Approaching HVs/EVs

➤ Simulated engine sounds

No.	Sound type	Remarks	Frequency
(8)	Steady sound	Created sound by a car manufacture	
(9)	Non-steady sound	Created sound by a car manufacture	
(10)	Non-steady sound	Created sound by a car manufacture	

Those sounds of frequencies and volumes change according to the vehicle speed.

Thank you very much
for your attention