



SRS: Slow Road's Section

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PROPOSAL

WHY?

The speed is not the only problem but the bad education as well because the manners, the character and the habits of a person define the way of driving. It is difficult to change the habits of those who have adopted them for a long time. In that sense, it would be hard to find a solution.

Living in Granada, a University city full of parties, with the attractive of the beach and snow at the same time, I am used to read on the newspaper “young man killed in a car accident, five others injured”. Hard words that people tend to associate to speed. Undoubtedly I would also add irresponsibility.

That is why with this project I try to force the drivers to slow down and at the same time to warn them since they are exceeding the speed limits.

How?¹

The project consists on an improvement on roads infrastructure. Thus, the main objectives are: to develop the idea on a theoretical way and try to implement it on a road's section (at a local level).

There is a need to persuade the driver, to force him, to reduce the speed. The well-known Watson's stimulus-response theory will be applied to achieve this result and amongst all of the possible stimulus, the one that can't be avoided, even being absent-minded, is the sound.

For this reason, the road surface takes a very important role in this project. Fitting the pavement with grooves or ridges, each extending across the road width, the noise is created by a passing car. This sound consists on a series of frequencies. However, these frequencies are not the tires or car oscillation frequencies as in normal road noise. Rather, they are *subjective frequencies* because they are created by their brain in interpreting the series of noise pulses that are emitted as the tires hit the grooves one after another.

Each impact emits a sound pulse but the time between the successive impacts is too small for you to perceive the individual pulses. Instead, you perceive the frequency of the impacts that it means how many impacts and pulses occur per second.

So depending on the groove's separation and the time that the driver is hearing the noise we can produce higher or lower frequencies, the sound will

¹ Road accidents are not evenly distributed throughout a road network. They occur at single sites, along particular sections of road. So this project refers to black spots and long straights.

be more or less disgusting and the answer will be definitely easing up on the gas in order not to hear the noise anymore.

It is important to know that only the drivers who exceed a certain speed limit will be affected with this noise.

The theoretical part consists on studying:

- Grooves separation
- Length of the stretch of the road which takes the grooves.
- Road signs to include in these stretches.

I will give the theoretical and experimental works to implement it just as the reasons of the project at a local level. It is like “selling” the idea so that they can fit them on a road, previously selected.

Moreover, there are also several secondary objectives to make this work reliable:

- Make a survey to know people's opinion about this proposal.
- Report the global media: local radio and newspaper, internet...
- Find a professor capable to check the theoretical work.

TO WHOM?

Many people are used to habits and it is really difficult to make them change.

There are loads of television campaigns and we listen to artists warning people to slow down, how dangerous drinking while driving is and so other things. My mother is a teacher and as she does, other teachers show the children how important driving with respect and caution is.

However, there is no way to make 45 driver aware, lover of speed with a sport car to slow down, or how does a novel driver pay attention to what a famous artist has to say? To that kind of people, it does not matter what somebody tells them about respect or caution on the road; campaigns are not enough, and they are the ones who not only die but kill or injure the others.

This project has been inspired on two of these people. Both of them, a young and a middle age man, have something in common: they love speed and they hate the sound of the rumble strips shoulders².

If we cannot open their eyes to show them the danger of their acts, we have to try it with another sense: the hearing. So the grooves mentioned before could achieve this goal.

² This project talks about something different to rumble strips. That is why we have to avoid the use of raised materials because abrupt rise or depression in the roadway can present problems to motorcyclists (imagine 20 meters long of rumble strips, would be crazy)

TIMETABLE

According to the schedule proposed by the ETSC, we have to give three reports: on September, November and January.

This project, deals with a theoretical part and the implementation one. To be precise:

From the 1st July to 30th August: theoretically develop the idea so that I can hand over in September. Moreover, I will try to contact a professor who can corroborate the veracity of my idea. This will have to be solved on the 15th of October.

From the 15th October to 1st November: maximum period to have had a meeting with the people who are able to work the idea in a road.

From the 1st November to 30th December: in case of having the possibility to put into practice the idea, I will collect all the results in a report. If not:

- If I set that my project is put into practice although it is out of the established period by the ETSC, the report will only contain what I have set on the meetings and the results of the surveys I have done.
- If it is not put into effect in any road, the report will deal about the information taken to the mass media and above all the results of the surveys.

COULD IT BE REAL?

The musical roads in Japan and Lancaster (U.S.A) show that the theoretical idea is possible. Thus, it makes the investigation not utopian but realistic and makes me carrying on. About the outcome, it is difficult to predict the real sound. Nevertheless the physics supports a result, showed on the shoulder rumble strips.

Sceptics think that there is no way to solve the speed problem and consider the accidents as a random event. However, I don't agree with it and it is better to act than not to.

With all of the arguments there is no problem in persuading a local responsible to see sense. The time factor, however, is a big one. The road infrastructure depends on a huge hierarchy that makes things happen slowly.

The survey will provide us with useful information. On the recent Spanish freeways loads of the latest improvements about roads security are implemented. Nevertheless, it is true that some people do not know anything about it. Thereby, it would be great to make them know and, at the same time, they can make me know what they think about this project. It is not enough to show the information on the road's panels.

Now that all is planned, there is still quite a lot to be done, and with effort, good results can be achieved.



PROGRESS REPORT 1

STATE OF THE PROJECT

The theoretical part has already been finished. Hence, I am focusing on the implementation one.

At present, a professor is looking through my work to corroborate or not what I have written. Thus, only if he approves my work he will help me with the authorities' contacts to put it into practice. However, on the contrary, I will get in touch with authorities by my own and the assistance of INTRAS and FITSA.

Once I get in touch with the authorities, the surveys, which I haven't finished yet, will come in useful.

I have spent so much time on the theoretical part because it has been necessary:

- To look up information about the topic. However, there is not much information available because this is something relatively new. Moreover, this information does not show several important data such as, for example, grooves separation, dimensions, etc...Finally, I used American physics websites information to adapt it to the phenomenon that happens with the sound on the road surface.
- To decide where to place the grooves and how to fit them to avoid destroying the pavement.

SUMMARY OF ACTIVITIES

To be precise, the activities carried out to date have been:

JULY

- Started the surveys to common people on the streets. However, most of the polled people were usually in a hurry. Thus, the surveys made were not enough and I finally decided to continue carrying it out by phone.
- Researched. A detailed bibliographical research was done from several books, magazines and websites as it is shown in annex I.



AUGUST

The design was based on the data collected from the bibliographical research and after understanding the sound concept.

Thus, the length of the stretch of the road which takes the grooves could be calculated by means of the speed of a car and the time that the driver should be listening to the sound.

On the other hand, the separation between indentations is estimated according to the speed of a car and the frequency of the produced sound.

Last but not least, the theoretical dimensions were compared with the shoulder rumble strips ones. According to the bibliography, both parameters experiment the same physic phenomenon. Therefore, as it was expected, the results obtained were similar in both cases.

Grooves fitted like it has been proposed in the project were found near from Guadarrama's tunnel. However, it was impossible to find some information about it. Nevertheless, a realistic test was done with a person who does not know anything about the grooves existence. The result obtained showed that the person slowed down maybe due to annoyance or surprise.

SEPTEMBER

The actions carried out during this month have been the following:

- Think about traffic signs to warn about this sound.
- Simulate pictures of a stretch of a road. These pictures showed how it would be with the grooves and the signs. Moreover, a video including how the sound would be like was also done.
- Get in touch with several professors and select the best one to corroborate the reliability of this project. This professor could also recommend me to the authorities in case he approves this project.
- Look up websites, newspapers and magazines related to this topic with the aim to explain them the project. After the first contact, the possibility to include a short article or a notice would be studied.

LIST OF FURTHER ACTIVITIES TO CONDUCT.

- Wait for the professor decision.
- Finish the surveys.
- Get in touch with the authorities and show them the project.
- Put into practice the idea on a road section and find data about the selected stretch.
- Inform the mass media.
- Evaluate the results.

TIMETABLE FOR THE REMAINDER OF THE PROJECT

October

L	M	M	J	V	S	D
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

November

L	M	M	J	V	S	D
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

December

L	M	M	J	V	S	D
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

January

L	M	M	J	V	S	D
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

15th October:

Second meeting with the professor to know his decision.

1st November:

Maximum date to have had a meeting with the authorities.

Send progress report 2.

30th November**15th December****30th December:**

Send progress report 3.

15th January:

Send final report

Blank dates: depends on the implementation. I will fill them on progress report 2.



PROBLEMS

From the beginning until now I haven't had any problem which hasn't been solved yet. However, new problems will appear according to the project progress.



ANNEX I: BIBLIOGRAPHY

BOOKS

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- ◆ Sonidos: proyectos y experimentos con música y ondas sonoras. Steve Parker. Barcelona, Parramon 2008
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