Project Group 5

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# Critical Review for: Group 8

**Overall comments**

A first glance at the report shows a clear *structure*; headings, outline and spacing between lines results in a easy-on-the-eye report. Considering much of the urban areas are crammed with roads for all sorts of purposes, the topic is very relevant and interesting from all aspects of sustainability. The pictures form an addition to information presented and help people who do not have background knowledge to visualise differences. Furthermore, the fact that the report considers the effects of not using steel fortifications, as seen in the discussion, is a very nice addition to the research done.

When reading the report carefully, it is noticeable that the *grammar and spelling* are off, however it is still clear what is tried to be said. The language is good, but sometimes the report is written from a personal perspective (e.g. "..we wish to compare and describe..") - a scientific report should be written from a neutral perspective, not including personal aspects. Other spelling mistakes include the missing or addition of words, as well as missing punctuation.

Looking at the table of content and the instructions for the report in the memo, it is noticeable that not all the *template headings* are used. The authors should take a look at this and try to implement them if still possible, to conform with the given instructions. The *abstract* does not contain any results or discussion, it is written more as a short introduction to the report rather than a summary.

Furthermore, there are some *inconsistencies and unclarities* throughout the report, for example within the literature review. First of all, the asphalt literature review has three sources mentioned and explained, this is not the case for the concrete literature review. Secondly, the information used from the references is unclear: the topic of the first source for the asphalt literature is planning, why does this relate directly to asphalt? Third, the last references used in the asphalt review contains information on concrete too, raising the question why the literature section was split this way.

**Transparency and completeness**

Some aspects remain *unclear* within the report, mostly concerning the waste scenario and cut-offs. For instance, the authors mention that the nodes were *cut-off* at 0.01% (asphalt) and 0.4% (concrete) of 'value', respectively. However, it is never specified whether the base value is volume, mass, or a different measure altogether. Similarly, it is not justified why the *waste scenario* should only include transport back to the production facility: surely the process of tearing up the road will also produce some amount of emissions?

**Methodology**

There are some aspects of the LCA that were *handled incorrectly*; mostly related to allocation issues and the waste scenario. First and foremost, even if the authors have not decided on *allocation issues* themselves, it is vital to acknowledge major allocation decisions already contained in the database - such as the multi-output facility for gravel extraction. Second, it is important to remain consistent within one's *waste scenario*. Within the assumptions and limitations, it is specified that all waste is recycled and transport is considered in the LCA; within both the detailed flowchart and the Life Cycle Inventory Analysis, it is assumed that some waste is landfilled instead; and in the

discussion of cut-offs and limitations, it is stated that "the waste at the end of the life time is overlooked, which basically means ignoring the transportation." (report p.25).

In addition, a *clarification of results* would be very appreciated. For example, it would be nice to see *normalized* results for the compared impacts at some point (compared to the impact of an average EU citizen during a year).

**Clarity of results and conclusions**

The chapter *Results* starts with a short introduction of the impact categories *Climate Change* and *Natural Land Transformation*. This could have been left out considering that the audience of this report is familiar with those terms - or should have been described in more detail, if the audience is expected to be unfamiliar with it. One way or the other it should not be introduced in this chapter as it takes the focus away from the actual results. Furthermore, the authors present their results in charts with a low resolution, e.g. Figure 15, which makes it hard to interpret the shown outcome. The description of this chart is also not informative enough. Therefore this chart could have been left out or should be explained better. In addition, the headings *Climate Change* and *Natural land transformation* are used twice within this chapter. The second time they are used, the headings entitle the actual results of the chosen impact categories. This part is rather informative and explains the origins of the environmental impacts sufficiently.

The conclusion is supported by the results but could be stated more clearly. For example, the authors conclude that a concrete pavement will have a higher impact in most categories including climate change. As the authors state that they are only focusing on the impact categories climate change and natural land transformation, which has been stated before and doesn't provide much relevant information. Though the authors meet the goal of their study, but since no aims and objectives were clearly defined, it can not be said that they were answering within the chapter *Results* and *Conclusions*.

**Improvements**

In a first step, it would be helpful if the *abstract* included key findings of the report as presented in the results section, instead of focussing on expected results.

Additionally, some suggestions presented throughout the text (such as examining how the use of warm mix asphalt would change the LCA) should be included in the *discussion* as proposals for further research - as has been done for the option of removing steel fortifications.

As a minor alteration, the many short *paragraphs* significantly disturb the reading flow. Combining these small paragraphs (often just 3-4 lines) into larger ones of the suggested length (8-12 lines) would both save space (enabling the authors to add more content if they wish) and improve readability.

In addition, quite a few improvements need to be made with respect to the *presentation of data*. Examples include Table 1, which would fit much better within the background section; and if the list of machinery used (p.11) were presented in table format, it would be much easier to understand. Also, it would be truly helpful if tables and figures could be referenced by their numbers in-text instead of using partial table titles or the phrase "the next table" when no table follows that sentence. In fact, we could not determine for sure if all tables referenced are even included in the document because we could not find some of them.

Finally, it would probably help readers if the authors could re-read their own report and try to *clarify* their statements as often as possible. At the moment, it is sometimes hard to understand what is being said, especially considering the table-referencing issue mentioned above.