

Review of: "The Effects of Polypropylene Wastes on the Compressive Strength of Grade 25 Concrete"

Patrizio Tratzi¹

¹ Italian National Research Council

Potential competing interests: No potential competing interests to declare.

General remarks: the article needs a revision of its structure and some conceptual revisions. The results are encouraging, but need a more thorough discussion and possibly further experimental work.

Abstract: Please recheck this part: "This was due to the increased problem of environmental pollution which may lead to flooding these wastes are causing in our environment. The research used the experimental methods in carried out the study." I suggest rewriting for clarity.

Introduction:

General suggestion: the introduction feels like a list of papers more than an organic view of the subject. I suggest rewriting the entire section, trying to build a more cohesive narrative and highlighting the most important and fundamental aspects of the works you are citing, especially in regards to how these papers contributed to your experimental work.

In detail:

First paragraph - please add sources regarding the increase in cement use globally.

Second paragraph - please add sources.

Fourth paragraph - the phrase "In a study conducted by Harikrisna et al. (2021) on the mechanical properties of concrete using plastic wastes: a review" reveals just a copy\paste of the article title, which is unneeded. Moreover, please provide by how much the mechanical properties were reduced instead of saying "by a slight amount". Personally, I would not use "they" to refer to the authors of the paper.

Fifth paragraph - Are the two works by Siddique et al. the same? In that case, rewrite; otherwise, you need to cite the article that is not in the bibliography. Moreover, clarify "recirculation" (is it recycling?). I suggest you clearly define by how much the mechanical properties of the cement increased with the addition of plastic waste.

Sixth paragraph - suggested rewrite of this section: "The study found that the use of low and high density polyethylene improved the compressive strength of the concrete, while the use of polypropylene (PP) reduced the compressive strength of the concrete. The study also found that the use of LDPE and HDPE improved the flexural strength of the concrete, while the use of PP reduced the flexural strength of the concrete." I suggest this solution: "The study found that the use of low and high density polyethylene improved the compressive and flexural strength of the concrete, respectively by x% and y%, while the use of polypropylene (PP) reduced these parameters, respectively by z% and n%"

Seventh paragraph - I suggest a better discussion of this source. What do you mean by “plate”? Moreover, the conclusions of the work need to be better explained because, as it is now, it seems too arbitrary.

Materials and methods: Please rewrite for clarity and move here the parts of “results and discussion” where you define the tests and standards you employed. Saying “various standards” is not acceptable here.

Results and discussion:

Change figure 2 so that the x-axis starts at 1 and ends at 10.

Compressive strength: As this is the main finding of this work, I suggest a statistical analysis to confirm that the results for concrete with 15% PP aggregate are significantly different from those of the control. I would also consider expanding on the causes of this increase other than simply citing a paper. You also definitely need to add numerical results, which cannot be reported solely in the conclusions.

I would also add a section regarding the possibility of leaching of (micro)plastic material from concrete: You say that at a certain percentage, this concrete can absorb higher volumes of water; it would be beneficial and interesting to investigate how much water, if any, leaches from the concrete, and whether plastic particles or microparticles can be found in the leachate.

Conclusions: Please rewrite as coherent paragraphs (or one, two, or three paragraphs) instead of a simple list. Moreover, I would refrain from saying that using plastic aggregates in this way may reduce environmental pollution without sources or experimental data (leaching of plastic, energy consumption of plastic collection, separation and shredding, the impacts of the alternatives, etc.).