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Drinking Water Engineering and Science Discussions

Interactive comment on "Verification of filter efficiency of horizontal roughing filter by Weglin's design criteria and Artificial Neural Network" *by* B. Mukhopadhay et al.

Anonymous Referee #2

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It is important that research is being carried out that may further help improving the situation in rural areas of the world. Yet reporting on such type of research needs to be more accurate and precise than the article mentioned above. Starting from the title it must be said that it does not properly reflect the content of the article. In fact a more appropriate title would be: Comparing performance of HRF predicted by Wegelins model and different Artificial Neural Networks.

The abstract indicates a general objective to estimate the performance by using Wegelins design criteria whereas in fact the objective is to compare Wegelins model and performance predicted by different Artificial Neural Networks. It then indicates that

the motive is to reduce the Slow Sand load in the raw water, which is wrongly stated as it refers to the reduction of the load of suspended solids or turbidity to improve the performance of a Slow Sand Filter. On the other hand the article does not clarify the latter issue.

The introduction has a number of unclear and even inadequate statements. For example the fact that surface water is polluted is not because it is exposed to the weather but because it may receive surface runoff, waste water and people may use it directly for defecation. Just imagine that if you step outside in the rain exposing yourself to the weather you would get contaminated. Another issue is that shallow groundwater may contain bacteriological pollution which may require treatment for example by SSF.

Another important limitation is that no clear review has been made concerning multi stage filtration (MSF) and even horizontal roughing filtration (HRF). A quick search on internet shows a diverse picture. In Latin America HRF is not used. Here the systems are mostly using the cheaper alternative of upflow roughing filtration (upflow gravel filtration) (Visscher, 2006). Whereas according to Jayalath and Padmasiri (1996) in Sri Lanka HRF is a common pre-treatment system.

Also a better description of the study of Wegelin would have been useful for the readers as this study is based on research using water that is mixed with kaoline. This does not reflect the real life situations in roughing filters which is affected by biological processes that are not reflected in the work of Wegelin. Galvis (1996) for example indicates that the results of Wegelins work show that efficiencies per unit filter length $>$0.001 cm-1 would be possible only when filtration rates of $<$2 mh-1, preferably $<$1 mh-1, are applied and the total filter length should be of the order of several meters to obtain significant total removals. He also stresses that in practice, other ambient or operational factors are not considered in the theoretical analysis.

Another remarkable issue is that when describing artificial neural networks no reference is made to recent articles that report on the positive application of such networks

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to support performance monitoring and optimization in for example Fernandez and Galvis, 1998; and Baxter et al 2002. A better review of the literature would have provided the opportunity to put the findings more in perspective because no doubt Artificial Neural Networks have a great potential for optimization of water treatment systems. They can also be useful for design purposes if used to interpret the data of longer term pilot testing.

As to DWESD review criteria

1. Does the paper address relevant scientific questions within the scope of DWES?

Yes

2. Does the paper present novel concepts, ideas, tools, or data?

Yes as in making a comparison between ANN and Wegelin's criteria for predicting HRF performance.

3. Are substantial conclusions reached?

No. the conclusions are poorly elaborated.

4. Are the scientific methods and assumptions valid and clearly outlined?

No. The paper is not well structured, the topics are not properly introduced and experience even from easily accessible references is not used.

5. Are the results sufficient to support the interpretations and conclusions?

No. the presentation of the results is too narrow focusing on the performance of the ANN model, whereas the conclusions address also the Wegelin model.

6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)?

No insufficient information is provided for fellow scientist to reproduce the study.

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7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution?

No. there is no adequate review of available literature

8. Does the title clearly reflect the contents of the paper? The title does not reflect the content.

9. Does the abstract provide a concise and complete summary?

No. The abstract needs to be rewritten

10. Is the overall presentation well structured and clear?

The overall structure is clear, but the paper needs clarification on various issues and considerable editing.

11. Is the language fluent and precise?

The language needs considerable editing

12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used?

No. the presentation of formulae and symbols need to be improved.

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated?

The paper needs to considerably improved (extensively rewritten)

14. Are the number and quality of references appropriate?

No. a much better review of available literature is needed.

Recommendation and other comments

The manuscript needs to be extensively improved

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Interactive Comment

References

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Interactive comment on Drink. Water Eng. Sci. Discuss., 1, 117, 2008.