

DECLARATION BY THE CANDIDATE

I, "*Chayan Gupta*", certify that the work embodied in this thesis is my own bonafide work and carried out by me under the supervisions of "*Prof. Arun Prasad*" in "*Department of Civil Engineering*" from "**July 2014 to July 2018**" at "**Department of Civil Engineering**", Indian Institute of Technology (BHU), Varanasi. The matter embodied in this thesis has not been submitted for the award of any other degree/diploma. I declare that I have faithfully acknowledged and given credits to the research workers wherever their works have been cited in my work in this thesis. I further declare that I have not willfully copied any other's work, paragraphs, text, data, results, *etc.*, reported in journals, books, magazines, reports dissertation, thesis, *etc.*, or available at websites and have not included them in this thesis and have not cited as my own work.

Date:

Place:

(Chayan Gupta)

CERTIFICATE BY THE SUPERVISOR

It is certified that the above statement made by the student is correct to the best of my/our knowledge.

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