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It is certified that the work contained in the thesis titled " *MODELLING AND ANALYSIS OF DRAGLINE BUCKET*" by *SHAH FATEH AZAM* has been carried out under my/our supervision and that this work has not been submitted elsewhere for a degree.

It is further certified that the student has fulfilled all the requirements of Comprehensive, Candidacy and SOTA.

Piyush Rai

(Supervisor and Head of Department)

## DECLARATION BY THE CANDIDATE

I, **SHAH FATEH AZAM**, certify that the work embodied in this thesis is my bona fide work and carried out by me under the supervision of **Professor Piyush Rai** from **2014** to **2019**, at the **DEPARTMENT OF MINING ENGINEERING**, Indian Institute of Technology, 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 dissertations, thesis, *etc.*, or available at websites and have not included them in this thesis and have not cited as my work.

Date:

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Place:

(SHAH FATEH AZAM)

## CERTIFICATE BY THE SUPERVISOR(S)

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

Piyush Rai

(Supervisor and Head of Department)

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