Proposal for Rehabilitation and Retrofitting of FRI Heritage Building

Submitted for funding under

CAMPA
Ministry of Environment, Forest and Climate Change (MoEF&CC)

by

Engineering Cell
Facility and Services Division
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Submitted to	:	CAMPA, MoEF&CC, GoI
Proposed Budget	:	Rs.10.35 Cr.
Duration	:	1 Year
Project Director	:	Dr. Renu Singh, IFS, Director, FRI
Coordinator	:	Er. Rajendra Singh Topwal, Scientist F, Head Engineering Cell, FRI

Introduction

Heritage buildings are a mute testimony in brick, stone and timber of the ceaseless efforts of man to express his capabilities in terms of architectural expression, engineering skills, understanding of construction materials and profound knowledge in site selection at a particular point of time. The Forest Research Institute Building is one of such examples, which has classical heritage of the city of Dehradun in the state of Uttarakhand.

Popularly known as FRI, the Forest Research Institute, Dehradun, is a Mecca of forestry research and education. This is a vast green paradise in the fast concreting city of Dehradun. The magnificent FRI building with its captivating architecture, spacious dimensions, beautiful landscape and built in sylvan surroundings of Doon Valley with outer Himalayas in the backdrop, is a testimony of evolution of forestry research and education. In1920, an estate of about 1,200 acre was acquired to house the present day FRI in the New Forest Campus. The splendid FRI building was inaugurated by His Excellency, Viceroy of India, Lord Irwin on 7th Nov 1929.Since there FRI has carried out lot of research activities and collected voluminous information on Indian Forests, Forest Products, NTFP and many other areas in the forestry.

Facts at a Glance of FRI Heritage Building

Plinth area	7 acre
Dimensions	1021'x276'
Architecture	Greco-Roman
Laboratory and offices	63000 Sqft
Museum area	26000 Sqft
Architect	G.C Bloomfield
Contractor	Ranjeet Singh
Construction cost	Rupees 90 Lakhs
Date of Inauguration	7th Nov.1929
Inaugurated by	His Excellency Viceroy of India Lord Irwin

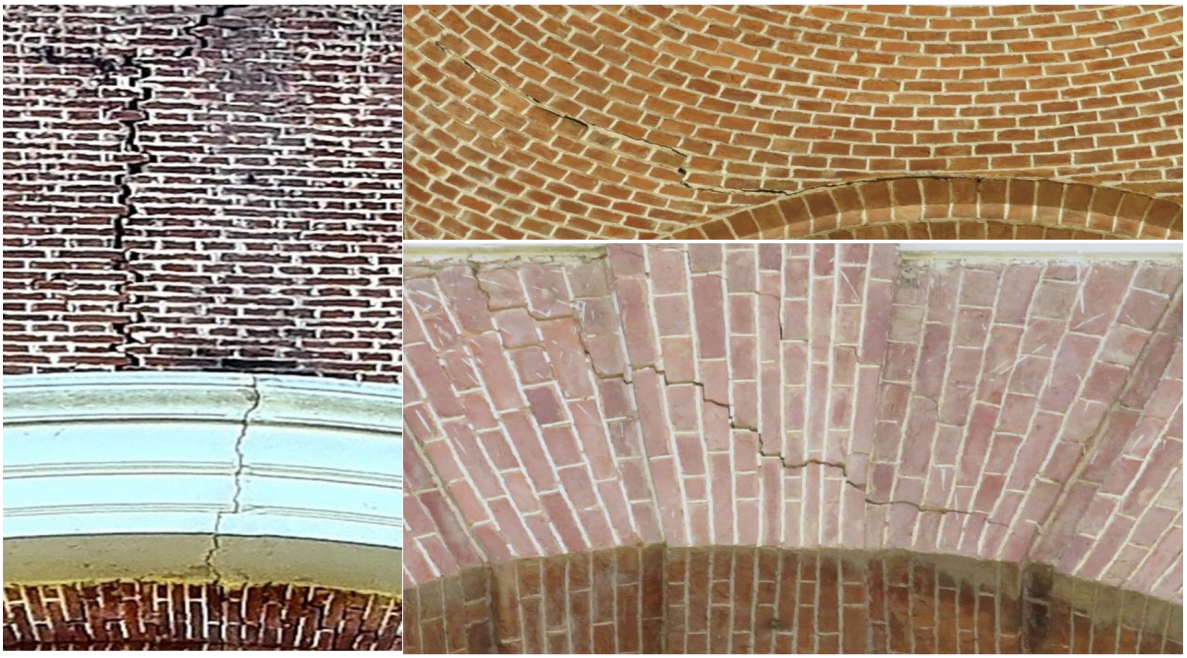
The building is housed with administrative and research activities/ repositories of the Institute which includes:

- The Director General, ICFRE, Dehradun
- The Director, FRI, Dehradun
- The Group Coordinator Research, FRI, Dehradun
- The Registrar, FRI, Dehradun
- Heads of Divisions.
- Convocation Hall, Board Room, and Seminar/ Training Halls
- Museums (Five) and Technology Demonstration Centre (One)
- National Forest Insects Collection (NFIC)
- Xylarium (One) and Fungarium (One)
- Archives and Laboratories of Forest Protection Division, Wood Anatomy of Botany Division and Forest Informatics & GIS Disciplines.

The museums and research labs are visited by researchers, students and extension activities are carried out to popularize the research outcomes. The building is also visited by the students of Architecture from different parts of the country. Many national & international workshops, seminars & conferences had been held in the building in the past. It has been visited by many dignitaries of National and International level.

The Problem:

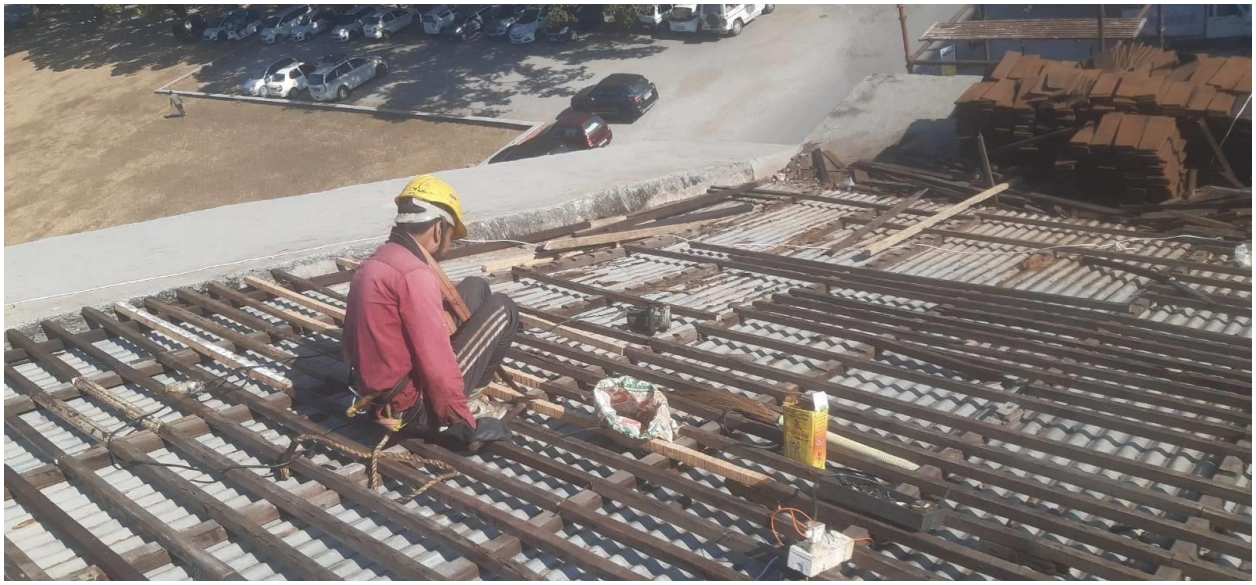
(a) Earthquake Cracks: An earthquake of Richter Magnitude 6.8 rocked the Garhwal Region of Western Himalayas on March 29, 1999 at 00:36:13.4 hours IST with epicenter at 30.408^{o}N, 79.416^{o}E near Chamoli/Gopeshwar. Due to this earthquake, numerous vertical cracks were developed at various places in FRI Building. Few of such crakes are presented hereunder through photographic representation,



(b) Contaminants Exposed Wall Surface: In addition to cracks due to earthquake, FRI Building made-up of exposed bricks opened on all sides with vegetation in close proximity of plinth by itself invites various type of algal contaminants, surfaces with dust, soot and other airborne pollutants etc.

(c) Old Roof Wooden Shingle Replacement:

Wooden shingle on the roof have been decayed and damaged, which need to be replaced urgently.



(d)Seepage Problem:

There is a serious seepage issue has been existing which is damaging the FRI main building. Factually, existing seepage at many places needs immediate treatment to protect the main building from further deterioration.


(e) Decayed window Frames:

The FRI Building has been witnessing classical carpentry in its windows and doors. However, doors and windows exposed to outside conditions are decaying sharply, which need immediately to be restored and replaced. All windows and doors of the building, whether outdoor or indoor, need repair, painting and polishing and even replacement for certain areas.




(f) Wall deterioration:

The exposed walls of FRI Building, at certain points, have weathered seriously and need urgent restoration through pointing and transparent silicone painting using modern tools so that original looks could be restored.


Initial initiatives of Rehabilitation &Retrofitting works of FRI Main Building:

During the year 2003, Central Building Research Institute (CBRI), Roorkee was consulted to address the above issues and to identify problems such as vertical structural cracks, cracks in arches, volutes and vegetation growth in the cracks and their possible solutions. A short term as well as long term measures and periodic maintenance were suggested by CBRI, and based on their recommendation, tendering process was stared during 2005 for repairing cracks with non-shrink epoxy grouting.The process was stopped with a view of decision of the MoEF&CC, New Delhi that Civil Construction Unit (CCU) should take over the maintenance and renovation of heritage building including (i) FRI Main Building, (ii) CASFOS and (iii) Ranger's College Building with double story hostel (City Section).The Board of Governors (BOG) of Indian Council of Forestry Research and Education (ICFRE) in its 36th Meeting held on 23-03-2007, conveyed the consent for such consultative study by IIT Roorkee. Accordingly, DG,ICFRE accorded his consent and sanctioned Rs. 33.67 lakh in August 2007.

In February 2008, Civil Construction Unit (CCU) New Delhi signed MOU with IIT Roorkee for Rehabilitation and Retrofitting of FRI Main Building, and an advance amount of Rs. 16.836 Lakh was paid to IIT Rookee for consultancy. The consultancy work for three years was given to IIT Roorkee to complete the work, under which it was to suggested the methodology for rehabilitation and retrofitting without compromising on aesthetics and heritage element of the building. The Superintending Engineer, CCU forwarded a report to the DG, ICFRE on 23rd May 2016. The IIT Roorkee was supposed to make a detailed estimate based outcome of their analysis, but IIT Roorkee showed their inability to prepare such estimate.

Initiative by MoEF&CC

A meeting accordingly was conducted on 21-06-2017 under the Chairmanship of DGF&SS, MoEF&CC, New Delhi to discuss this very important issue of repair and retrofitting works in respect of FRI main building. The meeting was attended by Shri N. L. Singh, Spl. DG(NR), CPWD, New Delhi and officials of (i) CPWD, (ii) CCU, (iii) FRI and (iv) MoEF& CC, New Delhi. In this meeting, it was decided that repair and retrofitting work will be executed by CPWD, New Delhi. Consequently, CPWD was requested to submit detailed project report (DPR) within a stipulated time of nine months. On this matter, official minutes of meeting were issued by DIGF(RT), MoEF&CC, New Delhi vide No. 1-29/2016-RTdated 27-06-17.

In this context, CPWD, Dehradun engaged Central Building Research Institute, Roorkee (CBRI) to prepare DPR and submit Technical Report. CBRI, Roorkee suggested immediate action on (i) treatment of exterior surfaces, (ii) long term recommendations and (iii) periodical maintenance with following points of consideration:

- Repair of plinth protection, drain, treatment of expansion joint of plinth protection have been taken.
- Cleaning of existing open drains, re-laying of C.C. 1:2:4 in open drains (damaged part only) with suitable waterproofing have been taken.
- Removing vegetation growth have been taken.
- Replacement of choked RWP have been taken.
- Seepage & roof repairs have been taken.
- Repairing of all vertical cracks/anchoring work/Grouting work have been taken.
- Replacement of missing on deteriorated bricks replacement with matching shade have been taken.
- Replacement of damaged wood shingle with new one i/e wood preservative paint has been taken.
- Treatment of external bio-deteriorated surface have been taken without changing the colour of existing surface.

Further, based on the Technical Report and recommendation of CBRI, **the CPWD submitted a DPR with estimate amounting to Rs. 16,86,40,000/- (Rupees Sixteen Crore Eighty-Six Lakh Forty Thousand only).** Based on this, Director General, ICFRE approved the estimate for Rs. 16.864 Core vide No. 04/2020-21 dated 12/06/2020, and initially an amount of Rs. 2.02 Crore was disbursed to CPWD, Dehradun so to start retrofitting works as per DPR.

The retrofitting works, was thereby initiated by CPWD in 2021, and after a satisfactory accomplishment of awarded work additional Rs. 4.50 Crore was disbursed again in February 2023 to CPWD. In this way a total of Rs. 6.52 Crore has been transferred to CPWD for the retrofitting works.

Activities already done or under progress

- Steam cleaning and sterilizing treatment to exposed brick and stone work
- Construction of shed above canteen area, reconstruction of damaged and sunk terrazzo flooring
- Retrofitment of walls affected adversely
- Lime concrete work below flooring for base preparation
- Repair and renewal of wooden roofing shingles with framework(About 5% has been competed).

PROPOSED ACTIVITIES TO BE UNDERTAKEN for 2023-24

- Retrofitment of domes affected (balance work)
- Restoration and renewal of wooden window frames and shutters.
- Siloxane treatment on exposed masonry and stone areas
- Polyurethane polishing of windows and doors.
- Finishing of terrazzo stone surfaces renewal of cast iron fittings, wherever is required
- Lime plaster as per original design, wherever required.
- Anti-termite treatment, wherever required.
- Plinth protection to check dampness in structure.
- Repair and renewal of wooden roofing shingles with framework, where required.

The Central Public Department (CPWD) has been demanded balance of Rs. 10.35 Crore to complete the above mentioned retrofitting works vide their letter No. 486 dated 22.02.2023.

Proposed Budget:

Non Recurring budget:

S. No	Requirement	Justification	**Cost in Lakh Rs.**
1	Retofitment of domes	Corridor domes have cracks and need retrofitting to stabilize the building.	**50.00**
2	Restoration and renewal of wooden window frames and shutters.	Almost exposed windows of the building have been decayed need restoration and renovation	**330.00**
3	Replacement of old roofing over the var. of Museums to check the seepage problem	Old G.I sheet roof have been damaged due to long life span of more than 93 years	**135.00**
4	Siloxane treatment on exposed masonry and stone areas, with breathable , non-reactive , antifungal and water repellent as approved by Archaeological Survey of India	Exposed wall surface need siloxane treatment required to protect from weather condition and sealing the surface .	**100.00**
5	Polyurethane polishing of windows and doors	All door window need polishing as this work did not carried out since last 30 years Wooden shingle on the room have been decayed and damaged and need replacement.	**50.00**
6	Finishing of terrazzo stone surfaces renewal of cast iron fittings, where required	Terrazzo flooring finishing and choked old Rain water pipe need to be replacement.	**15.00**
7	Lime plaster as per original design, where required.	Plaster of walls have been damaged at many places need lime plaster as per original design	**25.00**

8	Anti-termite treatment, where required.	Before placing the wooden shingles of roof ant termite treatment is required.	**25.00**
9	Plinth protection to check dampness in structure	At many places the plinth protection has been damaged which is causing the dampness in the building , therefore to check the dampness it is required.	**15.00**
10	Repair and renewal of wooden roofing shingles with framework	Wooden shingle on the room have been decayed and damaged and need replacement.	**290.00**
	Total		**1035.00**

Deliverables and Expected Output:

The funds will be used for enhancement the life of the heritage building, which is an example of architectural expression, engineering skills, understanding of construction materials and profound knowledge in site selection at a particular point of time at Mecca of Forestry Research and Education.

The heritage building is a knowledge house to not only researchers, students and teachers of forestry and allied sciences but also an inspiration to researchers of architect and numerous visitors to the building, and therefore appropriate showcasing would earn both fame and name to the forestry sector.