Volume 11, Issue 3, March – 2026 International Journal of Innovative Science and Research Technology
ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26mar1432

Refurbishment and Restoration of 80Liter Water Cooler

Omkar Pawar[1]; Harshad Yadav[2]; Rajesh Dudhane[3]; Rohan Khutwad[4]; Anup Raut[5]; Upmanyu Bangale[6]

[1;2;3;4]Authors; [5;6]Guide
[1;2;3;4;5;6]Mechanical Engineering, Bharati Vidyapeeth's Jawaharlal Nehru Institute of Technology

Publication Date: 2026/04/08

Abstract: The refurbishment and restoration of an 80-liter water cooler is a practical approach to extend the lifespan of existing equipment while reducing cost and material waste. This study focuses on identifying faults, repairing damaged components. and restoring the system to efficient working condition. The initial stage involved a detailed inspection to assess the physical and functional condition of the water cooler, during which key issues such as a faulty fan motor, damaged relay, compressor overload problems, rusted base sheet, low refrigerant levels, and a malfunctioning thermostat were identified. Following the inspection, defective components were carefully dismantled and either repaired or replaced with standard parts. Gas charging was carried out to restore proper cooling performance, and all electrical and mechanical connections were tested to ensure safety and reliability. The work was done in a way that reduces cost, uses old parts when possible, and follows proper basic maintenance. The results demonstrated a significant improvement in cooling efficiency and overall performance of the water cooler after restoration. The project also provides practial insights into common faults and repair techniques applicable to similar cooling systems.

Keywords: *Refurbishment, Faulty Components, Replaced, Cooling Efficiency.*

How to Cite: Omkar Pawar; Harshad Yadav; Rajesh Dudhane; Rohan Khutwad; Anup Raut; Upmanyu Bangale (2026) Refurbishment and Restoration of 80Liter Water Cooler. *International Journal of Innovative Science and Research Technology,* 11(3), 3525-3528. https://doi.org/10.38124/ijisrt/26mar1432

I. INTRODUCTION

Water coolers are widely used in homes, colleges, offices, and public places to provide clean and chilled drinking water. They play an important role in maintaining hygiene and comfort, especially in hot climates. However, due to continuous usage and lack of regular maintenance, their performance gradually decreases. Common issues such as poor cooling, unusual noise, electrical faults, gas leakage, and rusting of metal parts can affect their efficiency and reliability. In many cases, people prefer to replace the entire water cooler when it stops working properly. However, this increases cost and also leads to unnecessary waste. Refurbishment and restoration offer a practical solution by repairing and reusing the existing system. This approach not only saves money but also helps in reducing environmental impact by minimizing scrap and material wastage. This project focuses on the refurbishment of an 80-liter water cooler that was not functioning properly. The first step involved a detailed inspection of the unit to identify all faults. During this process, several problems were found, including a faulty thermostat, damaged relay and overload protector, non-working fan motor, low refrigerant gas, and a rusted base sheet. These issues were responsible for the poor performance of the system.

After identifying the faults, the damaged components were carefully removed and replaced with suitable parts. The refrigerant gas was refilled to restore proper cooling, and the rusted base sheet was repaired to improve the structural strength of the unit. Proper care was taken during reassembly to ensure safety and correct functioning. The main aim of this project is to restore the water cooler to its original working condition using simple and cost-effective methods. It also helps in understanding the common faults in cooling systems and the basic techniques required fixing them. This project highlights the importance of regular maintenance and shows that repairing equipment can be a better option than replacing it completely.

- *Problem Statement:*

Water coolers are widely used for providing chilled drinking water, but their performance decreases over time due to continuous use, poor maintenance, and environmental conditions. Common problems such as faulty thermostat, damaged relay and overload protector, non-working fan motor, low refrigerant gas, and rusting of the base structure can lead to inefficient cooling or complete failure of the system. In many cases, instead of repairing these issues, the entire water cooler is replaced, which increases cost and leads to unnecessary waste. There is a need to identify these faults

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properly and restore the system using simple and cost-effective methods. Therefore, this project focuses on analyzing the problems in an water cooler and finding suitable solutions through refurbishment and restoration to improve its performance and extend its working life.

II. LITERATURE SURVEY

Refurbishment and maintenance of cooling systems have been widely discussed in previous studies, especially in the field of refrigeration and air conditioning. Many researchers have focused on improving the performance and lifespan of cooling equipment through proper maintenance and repair techniques. It is observed that regular inspection and timely replacement of faulty components can significantly improve system efficiency. Studies on refrigeration systems explain the importance of key components such as the compressor, thermostat, condenser fan, relay, and overload protector in maintaining proper cooling. Failure of any of these parts can lead to reduced performance or complete system breakdown. Researchers have also highlighted that low refrigerant levels and gas leakage are common issues that directly affect cooling efficiency.

Refurbishment helps in reducing overall cost, saving energy, and minimizing environmental waste. Reusing components that are still in working condition is considered an effective way to achieve sustainable maintenance. In addition metal corrosion shows that rusting of base structures can weaken the system and reduce its durability. Proper cleaning, treatment, or replacement of rusted parts is necessary to maintain the strength and safety of the equipment.From the review of existing studies, it is clear that systematic fault identification, proper repair techniques, and regular maintenance play a key role in restoring the performance of water cooling systems. These findings support the approach used in this project for the refurbishment and restoration of an 80-liter water cooler.

III. METHODOLOGY

- *Initial Inspection*

The water cooler was first inspected carefully to understand its overall condition. Both electrical and mechanical components were checked. Visual inspection was also carried out to identify rust, damage, or loose connections.

- *Problem Identification*

After inspection, the major faults were identified. These included a faulty thermostat, damaged relay and overload protector, non-working fan motor, low refrigerant gas level, and a rusted base sheet. These faults were responsible for the improper working of the water cooler.

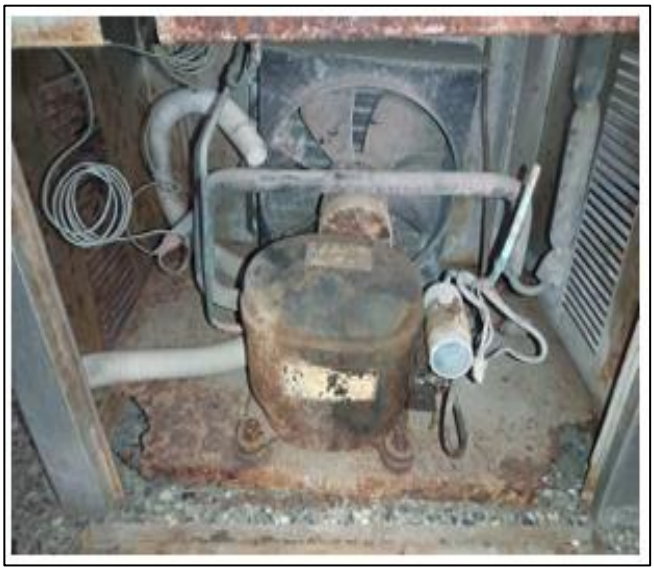

Fig 1 Internal View of Water Cooler before Restoration

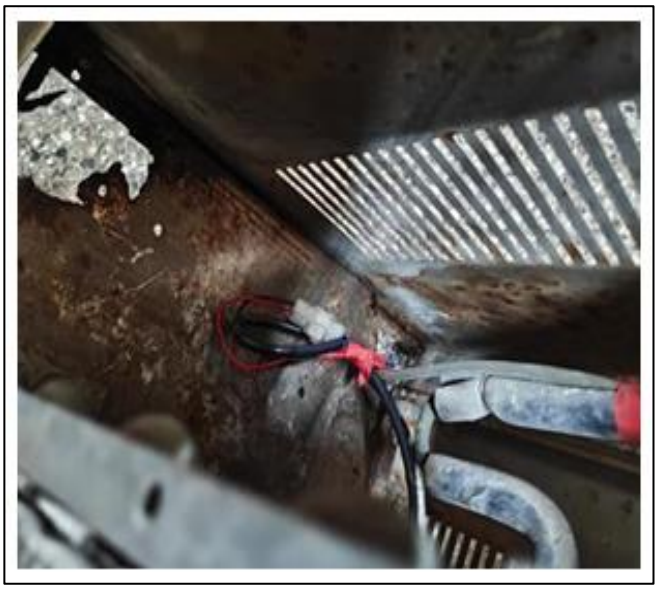

Fig 2 Rusted Base Sheet and Damaged Wiring before Repair

Fig 3 Damaged Fan Motor

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➢ *Planning of Work*

Before starting the repair work, required tools and spare parts were arranged. Safety precautions were also considered while handling electrical components and refrigerant gas.

➢ *Dismantling Process*

The outer body of the water cooler was opened, and internal components were accessed. Faulty parts were carefully removed without affecting other working components.

➢ *Component Repair and Replacement*

The damaged components such as thermostat, relay, overload protector, and fan motor were replaced with new or properly working parts. Some reusable components were cleaned and reinstalled to reduce cost.

Fig 4 Faulty Relay Overload Removed from the System

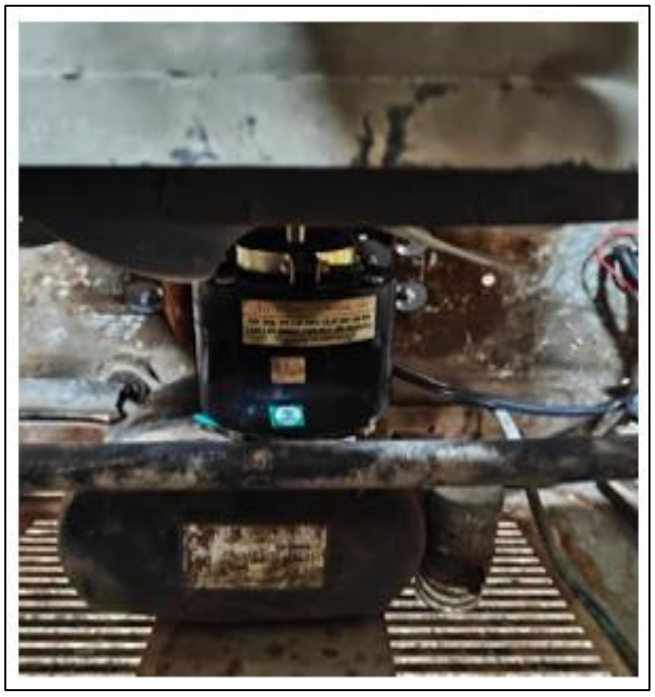

Fig 5 Installed New Fan Motor

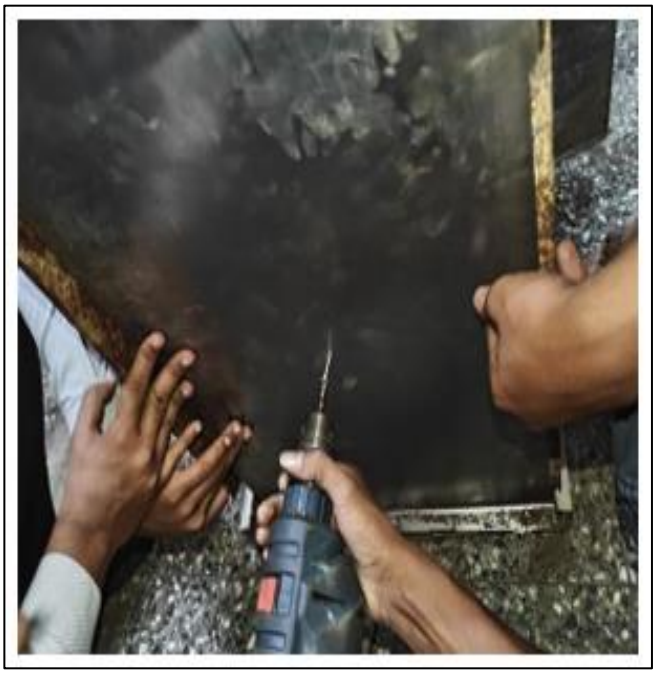

Fig 6 Installed New Base Sheet

➢ *Cleaning and Rust Treatment*

The rusted base sheet was cleaned and treated to prevent further corrosion. In case of severe damage, the base sheet was repaired or replaced. Internal parts were also cleaned to remove dust and dirt.

➢ *Refrigerant Gas Charging*

Refrigerant gas was filled to the required level to restore proper cooling performance. Care was taken to ensure no leakage during the process.

➢ *Reassembly*

After completing all repairs, the water cooler was reassembled. All parts were properly fitted and tightened. Electrical connections were checked to ensure safety.

➢ *Testing and Observation*

The water cooler was switched on and tested under normal conditions. Cooling performance, noise level, and working of all components were observed carefully.

➢ *Final Verification*

Finally, it was confirmed that all faults were resolved and the water cooler was functioning properly. The overall performance was improved after refurbishment.

IV. RESULT AND DISCUSSION

After completing the refurbishment and restoration process, the performance of the 80-liter water cooler was tested under normal working conditions. The results showed a clear improvement in the overall functioning of the system. The water cooler, which was previously not cooling properly, was able to provide chilled water efficiently after the repairs. The replacement of faulty components such as the thermostat, relay, overload protector, and fan motor helped in restoring proper electrical and mechanical operation. Gas charging

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played an important role in improving the cooling performance, as the correct level of refrigerant is necessary for effective heat transfer. The treatment and repair of the rusted base sheet also improved the structural strength and durability of the unit. During testing, it was observed that the cooling time was reduced and the system operated more smoothly without unusual noise or interruptions. All components were functioning properly, and no major issues were found after reassembly. The results confirm that proper fault identification and timely repair can significantly improve the efficiency and lifespan of a water cooler. This study also shows that refurbishment is a cost-effective solution compared to replacing the entire unit. Overall, the project was successful in restoring the water cooler to a good working condition and improving its performance.

V. CONCLUSION

This project focused on the refurbishment and restoration of an 80-liter water cooler by identifying and repairing its faulty components. The study showed that common problems such as a defective thermostat relay and overload issues, fan motor failure, low refrigerant gas, and rusted base sheet can significantly affect the performance of the system. By carefully inspecting, repairing, and replacing the damaged parts, the water cooler was successfully restored to proper working condition. Gas charging and basic maintenance further improved its cooling efficiency.

The results confirmed that the system was able to perform effectively after refurbishment. This project highlights that repairing and maintaining existing equipment is a cost- effective and practical solution compared to complete replacement. It also helps in increasing the lifespan of the equipment and reducing waste. Overall, the refurbishment process proved to be simple, effective, and useful for restoring the performance of water cooling systems.

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