Material Testing Software

Prepared By: Chetan Ambadkar

Date: 23/08/2025

Situation:

- In UBIXA testing lab, all reports are currently prepared manually using Excel and Word, which consumes significant time and effort.
- When a customer sends a letter for material testing along with the testing material, the letter details are first entered into a register book by staff.
- After that, the technician performs the required material test and writes the test readings on an observation sheet, which is then attached with the customer letter.
- The completed letter and observation sheet are handed over to the report analyst, who copies the respective material testing format from Word.
- The report analyst pastes the copied format into the client's folder and updates details such as project name, client name, letter date, testing date, and report date.
- Next, the analyst enters the observed readings into the report format and prepares the final report for printing.
- If the same letter contains multiple materials like cement, steel, or sand, the same manual process has to be repeated separately for each material report, making the overall reporting task repetitive and time-consuming.

Problem:

- Currently, every customer’s entry is recorded in a register, and whenever old customer details are required, searching through the register consumes a lot of time.
- While preparing reports, the report analyst copies the sample report format of the required material, pastes it into the respective customer’s folder, and then updates all the project details and test readings provided by the technician.
- During manual report preparation, mistakes often occur in formatting, such as font mismatch, incorrect font size, or table alignment shifting, which results in the final report not looking proper and professional.
- If any customer urgently requires a report or if old customer data needs to be retrieved quickly, it is difficult to find since everything is managed manually, requiring register book searching or browsing through multiple computer folders.
- This manual searching process takes excessive time, disturbs ongoing work, and often causes delays in delivering reports to customers, leading to dissatisfaction.

- Additionally, identifying how many letters were received in a month and how many reports were prepared is very difficult and time-consuming, making report tracking inefficient.
- Due to these limitations, report preparation becomes slow, and customers often do not receive their reports on time.

Opportunity:

- A centralized **Material Testing Software (MTS)** can completely replace manual registers and Word/Excel reports, allowing all customer letters and reports to be stored safely in digital format.
- During inward entry, report analysts can directly capture project details, client information, letter dates, and select the required material and test type, avoiding repetitive copy–paste work.
- The software will eliminate formatting issues like font mismatch or table misalignment by providing standardized report templates, ensuring all reports look professional and accurate.
- Powerful search functionality will allow users to instantly retrieve customer details, old reports, or urgent data requests without going through physical registers or multiple computer folders.
- Automated monthly dashboards will track how many letters were received, how many reports were prepared, and overall productivity, giving management a clear and reliable view of performance.

- The system will speed up report preparation, reduce errors, and ensure customers receive their reports on time, improving overall efficiency and client satisfaction.

Purpose Statement (Goal):

The purpose of this project is to design and implement a centralized **Material Testing Software (MTS)** for UBIXA that replaces manual registers and Word/Excel reporting with a fully digital system. The goal is to streamline the entire reporting process by enabling inward entry of customer letters with project details, client information, letter dates, material, and test type in one place. The system will provide standardized report templates to remove formatting errors and ensure professional-quality reports. It will also include powerful search options for quick data retrieval and automated monthly dashboards for tracking productivity. Overall, the project aims to save time, reduce manual errors, and deliver accurate reports to customers on time, improving both efficiency and client satisfaction.

Project Objectives:

- **Develop a centralized Material Testing Software** that will digitize report preparation, replacing manual Excel/Word processes and reducing repetitive work.
- **Enable inward entry of letters** with complete details such as project name, client name, letter date, and material/test type selection for accurate tracking.
- **Provide standardized report formats** in the software to remove formatting issues like font mismatch and table misalignment, ensuring professional and error-free reports.
- **Implement a secure digital database** for storing reports and customer letters with advanced search options, enabling quick retrieval of urgent data whenever required.
- **Introduce automated dashboards** to track monthly inward letters, prepared reports, and productivity, giving management clear visibility and supporting better decision-making.
- **Reduce delays in report delivery** by streamlining the workflow, ensuring reports are prepared faster and delivered on time to customers.

Success Criteria:

- **Centralized Digital Storage**
  Improve the availability and accessibility of test reports, customer letters, and project details through a centralized digital system, ensuring secure data storage and quick retrieval whenever required.
- **Faster Report Generation**
  Reduce manual effort, system downtime, and waiting time by implementing an automated process, ensuring faster, reliable, and accurate response for test report generation across all materials.
- **High Accuracy in Reporting**
  Achieve a minimum of 95% accuracy in data entry and report preparation through structured analyst-driven workflows, reducing human errors and enhancing report reliability.
- **Dashboards and Tracking**
  Provide monthly dashboards and advanced search functionality to track inward letters, completed material tests, and overall company productivity efficiently, supporting management decision-making and performance analysis.

Methods/Approach:

- **<u>Requirement Gathering</u>**

  Collect requirements from stakeholders like report analysts, technicians, and managers.

  Using Elicitation Techniques: interviews, Brainstorming, document analysis, and workshops.

  Document: **Business Requirement Document (BRD)**.

- **<u>Requirement Analysis</u>**

  After gathering requirements from stakeholders, the information is carefully studied to identify **gaps, conflicts, and priorities**.

  Functional requirements and **non-functional requirements**

  Requirements are analyzed to check **feasibility** (technical + business point of view) and to ensure they align with UBIXA's goals.

  <u>Documents prepared:</u>

  - Software Requirement Specification (SRS)
  - Use Case Diagrams
  - Requirement Traceability Matrix (RTM)

- **Design**

  Based on the finalized **SRS (Software Requirement Specification)**, the complete structure of the Material Testing Software is prepared.

  The design includes **workflow, database schema, input forms, and standardized report templates** to ensure accuracy and consistency.

  Documents prepared:

  - System Design Document (SDD)
  - Entity Relationship Diagram (ERD)
  - Data Flow Diagram (DFD)
  - Wireframes/UI Mockups

- **Implementation (Development)**

  Developers build modules: inward entry, report creation, manager approval, printing, and dashboards.

  Documents: Source Code, Unit Test Cases, Technical Documentation.

- **Testing**

  Testers validate functionality, accuracy, and performance of all modules.

  Documents: **Test Plan, Test Cases, Bug Report, Test Summary Report**.

  Finally, conduct **User Acceptance Testing (UAT)** with report analysts and managers to confirm the system meets business needs.

- **Deployment**

  Deploy the system in UBIXA lab for live usage by report analysts and managers.

  Documents: **Deployment Guide, Release Notes**.

- **Maintenance**

  Provide bug fixes, system updates, and enhancements based on user feedback.

  Documents: **Maintenance Log, Change Request Forms, User Feedback Reports**.

Resources:

- **People** – Business Analyst, Software Developers, Testers, Report Analysts, Technicians, Project Manager, and IT Support staff will collaborate to design, develop, test, and implement the software successfully.
- **Time** – The entire project implementation, including requirement gathering, design, development, testing, training, and deployment, is expected to be completed within **6 months** following the Waterfall methodology.
- **Budget** – Overall estimated project budget is **₹15,00,000**, covering manpower cost, hardware, software licenses, development tools, training sessions, implementation, and deployment services for UBIXA company.

  Software: ₹ 5,00,000

  Hardware: ₹ 2,00,000

  Training & Services: ₹ 8,00,000
- **Other** – Includes third-party software evaluations, validation site visits, technical documentation, and research reports to ensure accuracy and feasibility, with allocation included in the overall project budget.

Risks and Dependencies:

Risks:

- Current manual reporting process has been in use for years; shifting to a new system may face resistance from employees who are comfortable with existing methods.
- Incorrect or incomplete data entered by report analysts may lead to errors in final reports, reducing system accuracy and client trust.
- Delays in system development or testing may increase overall project timeline and budget, impacting business operations and deliverables.
- Hardware or software failures, including server downtime, could affect report generation, storage, and accessibility, impacting day-to-day operations.
- Lack of proper training for staff may result in improper use of the system, reducing expected benefits and slowing adoption.

Dependencies

- Project success depends on timely and accurate requirement gathering from stakeholders like report analysts, technicians, and managers.
- Reliable infrastructure, including servers, storage, and internet connectivity, must be available for smooth software deployment and usage.
- Continuous support and commitment from management and end-users are essential for adopting the system and achieving long-term success.

THANK YOU