Aerial Delivery Research and Development Establishment (ADRDE) Defence Research and Development Organisation (DRDO), Agra Cantt

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**1. Project Overview**

The AMC Monitoring Portal is designed to efficiently manage Annual Maintenance Contracts and related user activities.

It facilitates user management, AMC tracking, and reporting functionalities, providing a central database for storing

user roles, credentials, and access privileges.

**2. Purpose of the Database**

The database serves as the backbone of the AMC Monitoring Portal, maintaining structured information about users, their roles,

and system-level metadata. It ensures data integrity, supports user authentication, and forms the foundation for managing AMC records.

**3. Database Design**

The database is implemented using SQLite. The primary table in the system is 'users', which includes fields for storing user credentials,

email, full name, role, and timestamps. Unique constraints are applied to usernames and emails to avoid duplication.

**4. Table Structures**

Table: users

| Column Name | Data Type | Constraints |

|-------------|------------| |

| id | INTEGER | PRIMARY KEY AUTOINCREMENT |

| username | TEXT | NOT NULL, UNIQUE |

| email | TEXT | NOT NULL, UNIQUE |

| fullname | TEXT | NOT NULL |

| role | TEXT | NOT NULL, DEFAULT 'user' |

| is\_active | BOOLEAN | DEFAULT 1 |

| created\_at | DATETIME | DEFAULT CURRENT\_TIMESTAMP |

**5. Sample Data Overview**

Examples of records stored in the users table:

* admin (System Administrator)
* jane\_smith (Manager)
* john\_doe, sarah\_jones, mike\_wilson (Users)

All users were added on 29 June 2025 with active status enabled.

**6. ER Diagram (Conceptual Description)**

Currently, the system has one central table (users). In future expansions, related tables like 'amc\_contracts', 'service\_logs', or 'notifications'

can be linked to the 'users' table through user\_id to implement a full-fledged AMC management platform.

**7. Data Integrity & Constraints**

* Primary Key: id
* Unique Constraints: username, email
* Default Values: role (user), is\_active (1), created\_at (timestamp) These constraints enforce data integrity and avoid redundancy.

**8. Indexing & Optimization**

SQLite automatically applies indexes on unique fields (username, email). These indexes boost lookup performance during authentication and access control.

**9. Security Recommendations**

* Add hashed password storage (e.g., bcrypt)
* Implement session management for login tracking
* Add audit logs for changes in user roles or account status
* Separate roles into a dedicated roles table for normalization

**10. Future Enhancements**

* Implement full CRUD for AMC contracts
* Add role-based dashboards
* Include analytics and reporting modules
* Implement RESTful APIs for external integration

**11. Conclusion**

This database lays the groundwork for a secure, scalable AMC Monitoring system. With appropriate normalization, security practices, and interface development,

it can evolve into a robust internal tool for AMC lifecycle management at ADRDE.