

Fire Station Database Change Log

Automated System

March 24, 2025

Update - 2025-02-12 14:30:00

Changes Implemented

- Changed ON DELETE SET NULL to ON DELETE CASCADE for foreign keys referencing `FireStation`.
- Added a `Status` field to the `FireStation` table to manage active and inactive stations.

Details

Foreign Key Deletion Policy

Previously, deleting a fire station left orphaned records. Now, with ON DELETE CASCADE, related vehicles and staff records are also deleted.

Status Field in FireStation Table

A new `Status` column was added to indicate whether a fire station is active or inactive, preventing inactive stations from receiving new assignments.

Update - 2025-02-12 16:45:00

Changes Implemented

- Modified `SupplierItems` table to allow suppliers to provide the same item multiple times.
- Modified `StaffShift` table to allow staff members to take the same shift on different days.
- Modified `Vehicle` table to ensure that each vehicle has a unique Type-Model combination and proper foreign key constraints.

Details

Supplier Items Table Fix

Previously, a supplier could not provide the same item multiple times due to a composite primary key. Now, a unique `Supply_ID` and `Supply_Date` fields track each supply separately.

Updated Table:

```
CREATE TABLE SupplierItems (  
  Supply_ID INT AUTO_INCREMENT PRIMARY KEY,  
  Supplier_ID INT,  
  Item_Name VARCHAR(255) NOT NULL,  
  Quantity INT NOT NULL CHECK (Quantity > 0),  
  Supply_Date DATETIME DEFAULT CURRENT_TIMESTAMP,  
  FOREIGN KEY (Supplier_ID) REFERENCES Supplier(Supplier_ID) ON DELETE CASCADE  
);
```

Staff Shift Table Fix

Previously, a staff member could not be assigned the same shift more than once. Now, a unique `Shift_ID` and `Shift_Date` fields allow tracking of shift schedules over multiple days.

Updated Table:

```
CREATE TABLE StaffShift (
  Shift_ID INT AUTO_INCREMENT PRIMARY KEY,
  Staff_ID INT,
  Shift ENUM('Morning', 'Evening', 'Night') NOT NULL,
  Shift_Date DATE NOT NULL,
  FOREIGN KEY (Staff_ID) REFERENCES Staff(Staff_ID) ON DELETE CASCADE
);
```

Vehicle Table Fix

Previously, the schema did not enforce unique vehicle types and models properly. This could cause redundant or conflicting vehicle entries. The schema has now been improved to reference a separate VehicleModel table.

Updated Tables:

```
CREATE TABLE VehicleModel (
  Type VARCHAR(255) NOT NULL,
  Model_No VARCHAR(255) NOT NULL,
  Water_Capacity INT CHECK (Water_Capacity >= 0),
  PRIMARY KEY (Type, Model_No)
);
```

```
CREATE TABLE Vehicle (
  Vehicle_ID INT AUTO_INCREMENT PRIMARY KEY,
  Type VARCHAR(255) NOT NULL,
  Model_No VARCHAR(255) NOT NULL,
  Status ENUM('Available', 'In Use', 'Under Maintenance') NOT NULL,
  Station_ID INT,
  Last_Maintenance_Date DATETIME DEFAULT CURRENT_TIMESTAMP,
  FOREIGN KEY (Type, Model_No) REFERENCES VehicleModel(Type, Model_No) ON DELETE CASCADE,
  FOREIGN KEY (Station_ID) REFERENCES FireStation(Station_ID) ON DELETE SET NULL
);
```

Update - March 24, 2025

Changes Implemented

- Added unique constraint to StaffShift(Staff_ID, Shift, Shift_Date) to prevent duplicate shifts
- Created junction tables ReportVehicle and ReportStaff to handle multiple assignments
- Removed direct assignment fields from Report table

Details

Staff Shift Table Enhancement

Added a composite unique constraint to prevent duplicate shift assignments while allowing:

- Same staff member to work different shifts on same day
- Same shift to be assigned to different staff on same day
- Same staff to work same shift on different days

Updated Table:

```
CREATE TABLE StaffShift (
  Shift_ID INT AUTO_INCREMENT PRIMARY KEY,
  Staff_ID INT,
  Shift ENUM('Morning', 'Evening', 'Night') NOT NULL,
  Shift_Date DATE NOT NULL,
```

```

FOREIGN KEY (Staff_ID) REFERENCES Staff(Staff_ID) ON DELETE CASCADE,
UNIQUE (Staff_ID, Shift, Shift_Date) -- Prevent duplicate shifts
);

```

Report Assignment Restructuring

The previous design limited reports to single vehicle/staff assignments. The new junction tables enable:

- Multiple vehicles to be assigned to a report
- Multiple staff members to be assigned to a report
- Better tracking of resource allocation

New Tables:

```

CREATE TABLE ReportVehicle (
  Report_ID INT,
  Vehicle_ID INT,
  PRIMARY KEY (Report_ID, Vehicle_ID),
  FOREIGN KEY (Report_ID) REFERENCES Report(Report_ID) ON DELETE CASCADE,
  FOREIGN KEY (Vehicle_ID) REFERENCES Vehicle(Vehicle_ID) ON DELETE CASCADE
);

```

```

CREATE TABLE ReportStaff (
  Report_ID INT,
  Staff_ID INT,
  PRIMARY KEY (Report_ID, Staff_ID),
  FOREIGN KEY (Report_ID) REFERENCES Report(Report_ID) ON DELETE CASCADE,
  FOREIGN KEY (Staff_ID) REFERENCES Staff(Staff_ID) ON DELETE CASCADE
);

```

Simplified Report Table:

```

CREATE TABLE Report (
  Report_ID INT AUTO_INCREMENT PRIMARY KEY,
  Street_Address VARCHAR(255) NOT NULL,
  City VARCHAR(255) NOT NULL,
  State VARCHAR(255) NOT NULL,
  Pincode VARCHAR(255) NOT NULL,
  Description TEXT NOT NULL,
  Report_Date_Time DATETIME DEFAULT CURRENT_TIMESTAMP,
  Severity_Level VARCHAR(255) NOT NULL,
  User_ID INT,
  Action_Taken TEXT,
  Action_Date_Time DATETIME,
  Admin_ID INT,
  FOREIGN KEY (User_ID) REFERENCES User(User_ID),
  FOREIGN KEY (Admin_ID) REFERENCES Admin(Admin_ID)
);

```

Impact of Changes

- More flexible shift management without duplicate assignments
- Support for complex emergency scenarios requiring multiple resources
- Cleaner database design with proper many-to-many relationships
- Maintained data integrity through proper foreign key constraints