ELEVATOR TRACKING APPLICATION

Submitted by Amit Rana
Elevators in the US make 18 billion trips annually. However the vertical transportation systems don’t always work and it is estimated 190 million hours are lost every year to downtime for maintenance and repairs.

Elevator maintenance is a competitive business with OEMs competing with mid-size companies to provide reliable maintenance services with high customer satisfaction. Moreover the technician labor rates are constantly rising putting pressure on maintenance companies to find ways to keep costs of repair manageable. Usually a customer (e.g. building) will sign a contract with the maintenance company for a fixed duration (e.g. 1 year) and a specified fee. The maintenance company in return provides services such as regular preventative maintenance visits, emergency requests, and repairs.

The owner of a mid-size Elevator Maintenance Company is looking to develop a solution for elevators in his portfolio that his superintendents can use to help reduce elevator down-times and use their technicians more efficiently. A robust IoT solution could help provide superior service to the customer and reduced cost.
Persona

Rich
Field Superintendent

“Thousands of people rely on me to move them with safety and speed”

About

- 45, married, 20 years of elevator and escalator industry experience.
- In charge of portfolio of elevators with particular region
- Very mobile, spending time between office and customer sites
- I work with the Senior Engineer, Technicians, and Sales Representatives

Responsibilities

- Scheduling and assigning of preventative maintenance and repair orders, and executing orders
- Assist sales staff in estimating service contracts and orders
- Investigating and resolving customer complaints.
- Approve technician timesheets and approve customer bills

Main Goals

- Ensure that maintenance meets Area and Company quality standards and meets all customer requirements.
- Ensure technician work allocations are balanced and better management of time spent on equipment
- Reduce elevator downtime and unplanned repairs

Needs

- I need to view current status of elevators, and when an elevator has stopped operating
- I need better visibility to parts that fail often
- I need better visibility to elevator usage
- I need to assign orders and routes to my technicians more efficiently

Pain Points

- No alerts received if elevator fails – have to rely on customer call
- Difficult to re-route technicians when unplanned repair order is placed leading to long elevator downtime
- No metrics on elevator utilization
- Need to track time spent on the job and parts used
Point of View

As a Superintendent

I need a way to know when an elevator is at risk of being down or is stopped and dispatch my technician with the right parts

so that elevator downtime can be reduced
## User Experience Journey

<table>
<thead>
<tr>
<th>ACTIONS</th>
<th>Superintendent Rich receives call from customer about elevator not working</th>
<th>Rich looks at technician work-schedule to see who is closest to customer site</th>
<th>Technician Bill receives dispatch of repair</th>
<th>Bill arrives at customer site and finds elevator and diagnoses issue. He doesn’t have the part</th>
<th>Bill goes back to office to get appropriate part and returns to fix issue. Elevator back in service</th>
<th>Rich is informed elevator is back in service and he informs customer. Checks if service is billable and approves Bill’s hours and parts used</th>
</tr>
</thead>
<tbody>
<tr>
<td>MINDSET</td>
<td>I don’t have any technicians on stand-by</td>
<td>Who is nearest and available?</td>
<td>Let’s send Bill to check on the problem</td>
<td>I don’t know which elevator is the issue and what the problem is</td>
<td>So much time is wasted driving back and forth from the office. I wish I had better information on what the issue is</td>
<td>It took long time to fix and customer is not happy</td>
</tr>
<tr>
<td>FEELING</td>
<td>😊</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOUCH POINTS</td>
<td>Call Desk</td>
<td>Work schedule</td>
<td>Work Order Field tech</td>
<td>Site map Equipment manual</td>
<td>Part request Time logging</td>
<td>Invoice Email Timesheet</td>
</tr>
</tbody>
</table>
Solution Overview:

Based on the needs, the following solution has been proposed:

• I need to view current status of elevators, and when an elevator has stopped operating
  Solution: sensors installed on key elevator components like doors, motor, and control panel to track elevator movement and convey any anomalies
• I need better visibility to parts that fail often
  Solution: simple reporting to view what parts have been used often in repair jobs
• I need better visibility to elevator usage
  Solution: Using sensors installed to track trips and elevator usage data during the day
• I need to assign orders and routes to my technicians more efficiently
  Solution: Schedule optimization function to balance technician work-load and allow buffer to react to repair calls

The mock-ups focus on the first solution of using sensors to track elevator status and usage.
Mock-up:

Dashboard Screen
The initial screen will contain several icons at the top for functions the Superintendent wants to perform such as view elevator list, check the remote monitoring status, schedule technicians, create/view invoices, and view any calls received.

In this example, the elevator list is displayed listing out all the elevators in his portfolio along with status of the elevators (i.e. running or stopped).

<table>
<thead>
<tr>
<th>Elevator List</th>
<th>Monitor</th>
<th>Schedule</th>
<th>Invoice</th>
<th>Complaints</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Elevator</strong></td>
<td><strong>Type</strong></td>
<td><strong>Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building A Elevator, 123 Main Chicago ID-1079988</td>
<td>Schindler Hydraulic Elevator</td>
<td>Running</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sears Tower, 222 Adams Chicago ID-9899895</td>
<td>Otis Traction Elevator</td>
<td>Stopped</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parking Garage, 222 Adams Chicago ID-1023223</td>
<td>Schindler Escalator</td>
<td>Running</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Detail Screen
Clicking on specific elevator opens up the details on the elevator including location, contact person, status, service and notification history, trip/usage history, and further drill downs into the equipment.

ID-1079988
Building A Elevator
123 Main St., Chicago IL
Running

Trips

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