Modernizing Work Planning in MTA-NYCT

Using Enterprise Asset Management and GIS Linear Referencing System

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Department of Subways
Defining Where
Subways Locator Tool
Vacuum Train Work Orders
NYC Subway System started life as three private companies about a century ago.
Interborough Rapid Transit Company (IRT)
Brooklyn-Manhattan Transit Corporation (BMT)
Independent Rapid Transit Railroad (IND)
Merge of Three Companies

- The three companies were combined to form the Transit Authority.
- Added complexity to the agency with inconsistent naming standards and measurements along Tracks.
Enterprise Asset Management and Linear Referencing

- Solution using Enterprise Asset Management (EAM) and Linear Referencing System (LRS).
- Enterprise Asset Management - Central repository for Assets, Defects, and Work Orders and management of Asset life cycle.
- Linear Reference - Create geometries based on attributes not manual digitizing.
- NYCT Linear Referencing is complicated. Measures can jump, have a gap, and even reverse.
Custom Projection
Importance of Linear Referencing

- 60% of our Tracks are underground; GPS is not available.
- Linear Referencing used to locate data along Tracks above or below ground.
Linear Referencing Route & Measure

Route

IRT - C - 1

Measure

1,290

*Engineering Line
Not Train Service Lines
Linear Referencing: Point Features

**Route**

- **Division**: IRT
- **Line**: C
- **Track**: 1, 2
- **Measure**: 1,290 FT
- **Service Line**: 7
- **Name**: Flushing Line

New York City Transit
Linear Referencing: Linear Features

Route

Division: IND
Line: D
Track:
1
3
4
2
Measure:
1,000 FT
2,000 FT

Service Line:
E
F
M
R
Name:
Queens Blvd Line
Besides our Tracks Centerlines and polygons, we do not manually digitize any of our current Assets, Defects, or Work Orders along the Right of Way. It all gets created or updated by Linear Referencing.
Subways Locator Tool
Digital Visualization of Assets

• Agency still heavily paper based.
• Lack of visualization in digital capacity.
• Enterprise Asset Management and Linear Referencing to turn that around.
Subways Locator Tool
Subways Locator Tool
Capture Movement or Installment of New Assets
Vacuum Trains
Digital Visualization of Work Orders

- Vacuum Train Initiative created by Subway Action Plan (SAP enacted 2017).
- Goals to reduce train delays and improve services.
- Vacuum Trains reduced trash & Track fires.
Vacuum Trains
Paper Report

Vacuum Train runs were originally reported on paper but since the beginning of October they are now being digitized.
Vacuum Trains in EAM
Vacuum Trains in EAM
Vacuum Trains Application
Vacuum Trains Application

Filter

Vacuum Train Work Orders

Enter Date Range

11/1/2019, 12:00
and
11/20/2019, 12:00

Vac Train Number is
VT005

Enter Division
BMT

Enter Line
BMT-G-ASTORIA

Enter Track
BMT-G-1
Vacuum Trains Application

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vacuum Train Number</td>
<td></td>
</tr>
<tr>
<td>Date Work Order Completed</td>
<td></td>
</tr>
<tr>
<td>InforEAM Work Order #</td>
<td></td>
</tr>
<tr>
<td>Total Cubic Yards Dumped</td>
<td></td>
</tr>
</tbody>
</table>
Vacuum Trains Application
Vacuum Trains Application
Vacuum Trains Application

Length of completed track segments by Division

- BMT
- IND
- IRT
# Vacuum Trains Application

<table>
<thead>
<tr>
<th>Track Vacuum Trains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Order Record</td>
</tr>
<tr>
<td>Work Order</td>
</tr>
<tr>
<td>Date Completed</td>
</tr>
<tr>
<td>Track</td>
</tr>
<tr>
<td>From Point</td>
</tr>
<tr>
<td>To Point</td>
</tr>
<tr>
<td>Completed Length (ft)</td>
</tr>
<tr>
<td>Cubic Yards Dumped</td>
</tr>
<tr>
<td>Vac Train Num</td>
</tr>
<tr>
<td>Track Subdivision</td>
</tr>
<tr>
<td>Description</td>
</tr>
<tr>
<td>From Position</td>
</tr>
<tr>
<td>From Station</td>
</tr>
<tr>
<td>To Position</td>
</tr>
</tbody>
</table>
Vacuum Trains Application

<table>
<thead>
<tr>
<th>Work Order</th>
<th>1756347</th>
<th>Track Vacuum Trains</th>
</tr>
</thead>
</table>

- **Status**: Job Completed
- **Equipment**: 302374
- **Common Name**: 302374
- **Responsible Division**: DOS-MOW-TRK
- **Responsibility Center**:  
- **Monitoring Division**: DOS-MOW-TRK
- **Type**: Corrective Maintenance
- **Class**: TK-VACTR
- **Job Number**: TK-VACTR
- **Standard WO**: TK-VACTR
- **PM Code**:  

- **Borough**:  
- **Division**: BMT
- **Line**: BMT-B-BROADWAY
- **Section**:  
- **In/Nearest Station**:  
- **Track**: BMT-B-2
- **From Point**: 32,590 Feet
  - **325+90**:  

- **eSignature**:  
- **eSignature Date**:  
- **Status**: Job Completed
- **Auto-Action**:  
- **Equipment Criticality**:  
- **Nonconformity Severity**:  
- **External Influence**: 5 – Typical Urgency
- **Priority**:  
- **Reported By**: 1097098
- **Date Reported**: 11/04/2019 02:44
- **Assigned By**: 
- **Assigned To**: 
With Enterprise Asset Management and Geospatial Technologies, we are modernizing and moving forward.