



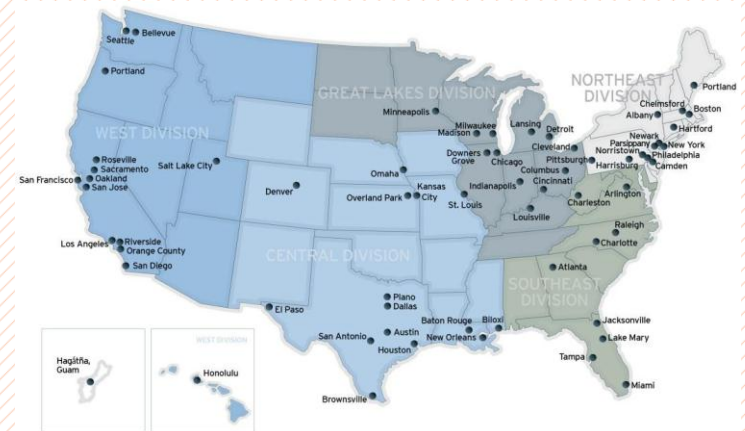
# Presentation to the Swiss Public Transport Journalists

# Agenda

- HNTB Overview
- HNTB Rail Systems Qualifications
- The Swiss Connection
- Overhead Contact System Capabilities
- Swiss Expertise

# Corporate Overview

- Multidiscipline engineering firm specializing in rail/transit, aviation, DOT, toll, and water market sectors
- Architectural, engineering, consultant firm with more than 3,700 personnel in more than 70 offices nationwide
- #1 Go-To Mass Transit Design Firm (*Road & Bridges* - 2012)
- Celebrating 100 year anniversary



# Local Presence

- Northeast
- New York
- New Jersey
- Pennsylvania
- Massachusetts
- Maine
- Connecticut



# HNTB Rail and Transit Client Map



**LEGEND**

- 2004 - 2014 transit clients
- HNTB has nationwide AMTRAK, BNSF and Union Pacific projects.

# HNTB Rail Systems Qualifications

- 400+ professionals specializing in rail/transit and railroad design engineering and inspection
- 100+ professionals specializing in rail/transit systems engineering
- Rail resources positioned strategically throughout the country to service our clients
- Massachusetts office is the National Center for Systems Engineering



# Overhead Contact Systems Capabilities

# Zakim Bridge

- Leonard P. Zakim Bridge Interstate-93
- Landmark bridge and structure
- HNTB Engineer of Record
- Conceptual designer- Christian Menn of Switzerland





# OCS Capabilities

- Conceptual design
- Complete detailed design
- Construction phasing plans
- Existing system evaluation and condition assessment
- Renovation and modernization of existing systems
- Feasibility studies for new lines, planned extensions and improvements to existing systems
- Value engineering for various types of OCS design
- Transmission line design
- LiDAR surveying

# Major OCS Clients

- Amtrak
- MBTA
- SEPTA
- Caltrain
- MNRR
- Toronto Transit
- SANDAG
- Muni
- DART
- Baltimore MTA
- St. Louis Metro
- San Jose VTA
- Los Angeles Metro
- Milwaukee Streetcar
- Washington DC Streetcar



# Swiss OCS Expertise



# Toronto Transit Commission OCS Conversion

- New fleet of streetcars
- Entire system OCS conversion  
82km of track
- Elastic suspension
- Special low bridge suspension
- Reduction of hardware at intersections
- Sectionalizing at Grand Unions
- Aesthetic OCS
- Utilizes Kummler+Matter overhead
- HNTB leading the OCS design in conjunction with TTC engineers



# Toronto Transit Commission K+M Overhead Components



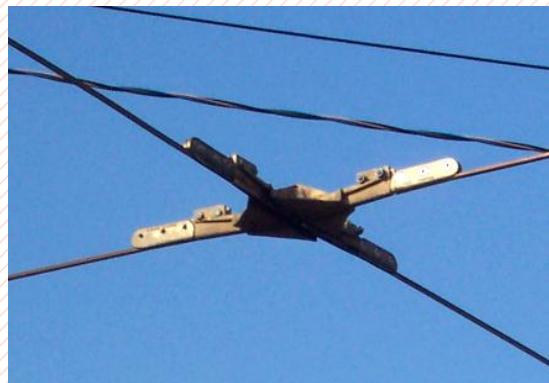
Low bridge supports



Aesthetic intersections



Diode section insulator



Pole/pantograph crossing



Pole/pantograph curve pullovers

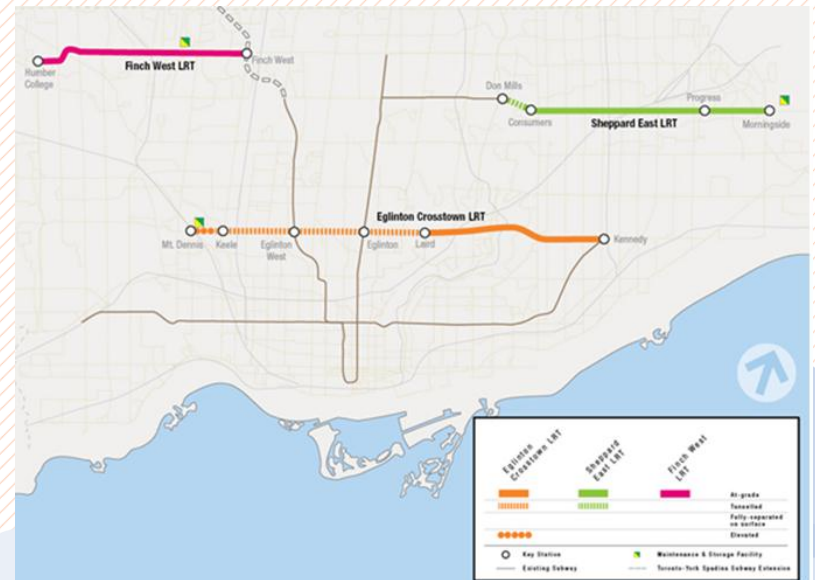
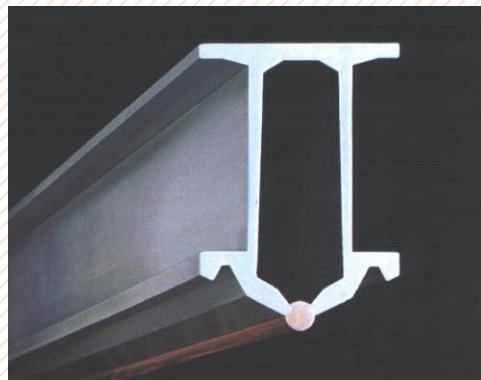
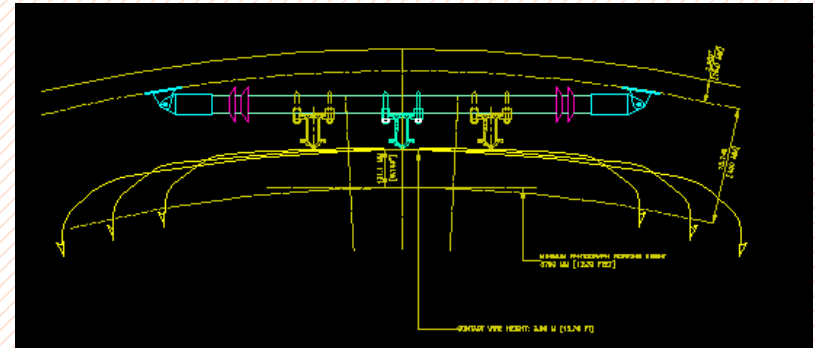
# Elastic Arms-Union Station

K+M  
Elastic Arm



# Toronto Transit Commission Eglinton Tunnel Conductor Rail

- 19 km of tunnel
- Overhead system is Furrer + Frey conductor bar
- Concept designed by HNTB



# Amtrak Thames River Bridge

- New bridge for Amtrak over the Thames River in Groton, Connecticut
- Bridge and OCS designed by HNTB
- Overhead system is Furrer + Frey conductor bar
- All Amtrak movable bridges use F+F Conductor Bar



Thames Bridge by HNTB



Furrer+Frey  
Conductor Bar



# Amtrak and SEPTA Section Insulators

- Electric Railroads use Sectionners
- Arthur Flury Sectionners in Use
- Excellent Results



SEPTA Regional Rail System

# MBTA Boston Overhead Contact System

- Extensive use of Kummner + Matter OCS Hardware

- Used in light rail, streetcar and trolley bus system

- K+M hardware is use

- Section insulators
- Pullover arms
- Trolley wire splices
- Wire crossing devices
- Door bridge devices
- Elastic hangers
- Elastic arms
- Insulators



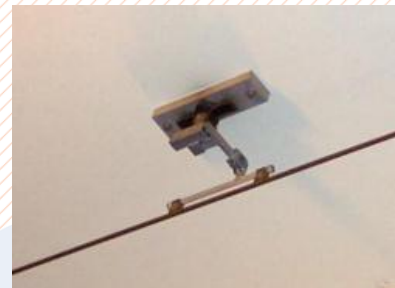
- Steady arms
- Cantilever arms-ARCAS system
- Trolley Bus switches and crossings
- Inclined Pendulum Suspension
- Balance weights and weight brakes

# K+M Engineering Excellence

## Meeting the needs of the client

- Modifications to Elastic Hanger
  - MBTA required articulation
  - K+M incorporated this into their standard part
- Modifications to Elastic Arm
  - MBTA required swivel end
  - K+M designed special fitting now a standard part
- Special contactor for Trolley Bus Switch
  - Designed special parts

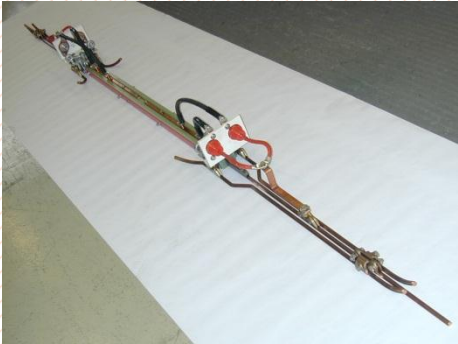
- Diode Sectionner for pantograph
  - Designed for all pantograph operation
- Short Pendulum
  - Designed for Harvard Square Subway



# K+M Components



Feed Tap Clamp



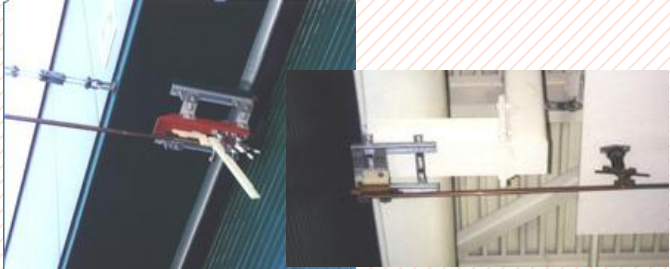
Diode Sectionner for Pantograph



Between the Tracks  
Balance Weight



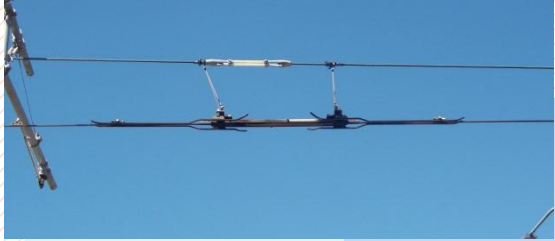
K+M  
Weight Brake



Roll up Door Bridge



Balance Weight Brake



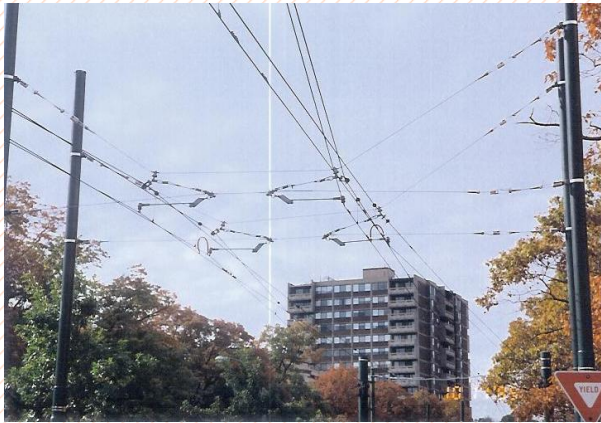
Double Beam Sectionner

# K+M ARCAS Cantilevers Assemblies



MBTA Blue Line

# Overlaps



Original Overlap Beacon Street Overlap



Blue Line Airport Overlap



Rebuilt Overlaps



# Trolley Bus-Silver Line



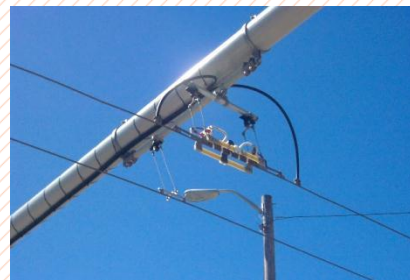
Switches and Crossings



Short Pendulums



Elastic Hangers



Diode Section Insulators

# Trolley Bus-Cambridge/Watertown/Belmont

Special Switch  
Contactor



Cambridge Common



Cut-in Switch

North Portal



Waverly Square

Tube Switches  
and Crossings



West Portal



# Swiss OCS Engineering and Material

- Highest quality material
- Well engineered-like a “Swiss Watch”
- Ensures reliable train operation
- Minimal maintenance



# HNTB Philosophy

- Quality Work
- On Time
- On Budget
- To the Client's Satisfaction

# End

