

Amtrak Procurement and Program Updates



The NGEC will provide national leadership in standardization, acquisition, financing and management of passenger rail equipment.

Multi-State SC44 Update

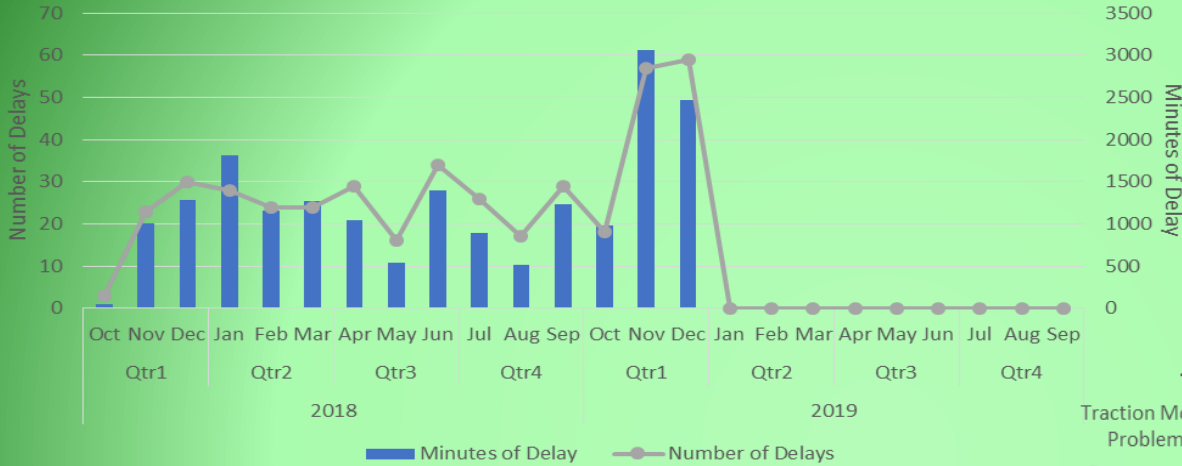


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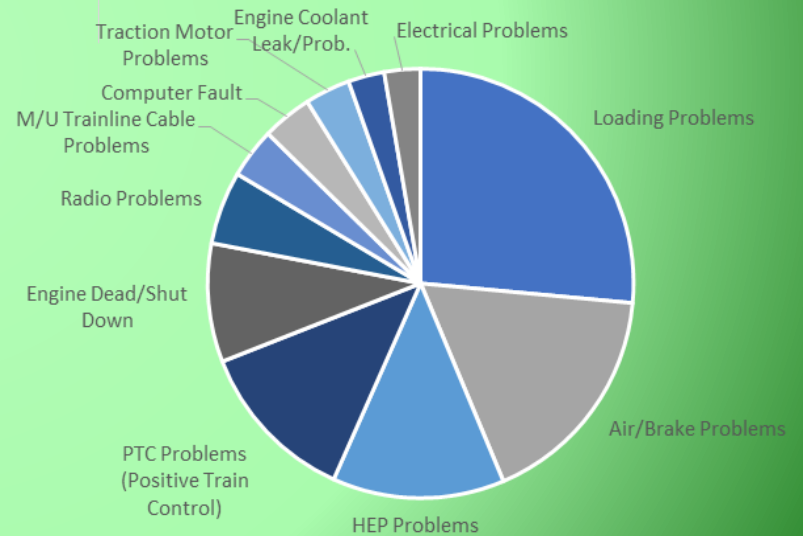
Multi-State SC44 Update

SC44 Fleet Performance

Monthly Number & Minutes of Delay



FY18 Top 10 Problem Codes



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Multi-State SC44 Update

Siemen Chargers (SC-44) Life Cycle Preventative Maintenance Events	Life Expectancy
Trucks	2 Years
Electrical Distribution Aux and Battery	
Power Electronics and Propulsion System	
Main Engine	
HEP System	
Compressed Air Equipment	3 Years
Fluid Cooling	
Fuel System	4 Years
Compressed Air Equipment	
Fluid Cooling	
Primary High Voltage	5 Years
Electrical Distribution Aux and Battery	
Brakes	
Fuel System	
Fluid Cooling	
Carbody	6 Years
Trucks	
Coupler	
Power Electronics and Propulsion System	
HEP System	
Compressed Air Equipment	8 Years
Forced Air Cooling	
Fluid Cooling	
Power Electronics and Propulsion System	
Carbody	
Trucks	10 Years
Electrical Distribution Aux and Battery	
Brakes	
Compressed Air Equipment	
Forced Air Cooling	12 Years
Fuel System	
Fluid Cooling	
Primary High Voltage	
Carbody	
Trucks	15 Years
Power Electronics and Propulsion System	
Fuel System	
Fluid Cooling	
Primary High Voltage	15 Years
Fluid Cooling	

Cummins (QSK95) Main Engine Life Cycle Preventative Maintenance Events	Life Expectancy
Supplemental Coolant Additive (SCA)	4,000 Hours
Fuel Pump	6,000 Hours
Aftertreatment Intake NOx Sensor	
Aftertreatment Outlet NOx Sensor	
Cooling System Heater Control Panel	
Cooling System Heater Assembly	
Hydraulic Pump Coupling Drive	8,000 Hours
Fuel Injectors	
DEF Doser	10,000 Hours
Overhead Set	12,500 Hours
Turbocharger	
DEF Supply Module	15,000 Hours
Vibration Damper, Viscous Turbocharger	25,000 Hours
Cummins Main Engine	55000 Hours

Owner	Maintenance Base	Quantity in Service [TOTAL EXPECTED]
Midwest DOTs (IDTX)	CHI	23 [28]
Caltrans (CDTX)	OAK	8
Caltrans (CDTX)	LA	13 [14]
Wash DOT (WDTX)	SEA	7 [8]

- **EXPEDITED PARTS SUPPLY & 24/7/365 NETWORK TECHNICAL SUPPORT → TSSSA Development**
- **PTC Issues:**
 - All prior survey findings resolved via Siemens FMI or Amtrak commissioning process – all locomotives IETMS commissioned
 - Monitoring Train Control operations/defects
 - Locomotive Overspeed Interaction (ATS, ITCS)
- **Inclement Weather Issues:** [Siemens Engineering initially addressing with A8 software release and FMI implementations]
 - Dynamic Brake Grids susceptible to moisture (from rain and snow as bus bars not insulated, cabinet not sealed correctly, resistance tolerance, fan/air issues)
 - Crankcase Eductor susceptible to ice buildup
 - Cottonwood and Debris Ingress
 - Undercarriage and HEP transformer pumps



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Amtrak Multi-State SC44 Impressions

- Good communication and execution among Siemens, Cummins and States
- Modular platform approach to maintenance beneficial.
- Looking to reduce/extend component intervals as platform matures
- Impressed with propulsion system and Cummins QSK95
- Front strike damage not easily repaired and certain areas of undercarriage not robust to debris/weather elements
- Significant amount of PTC launch issues
- Lack full advantage of OTP delay mitigation and predictive analysis without RDA access and 24/7/365 Siemens support
- Extreme Environment Operations are an opportunity to improve
 - Dynamic Brake circuit susceptible to debris and earth fault grounds → multiple issues
 - QSK95 cold oil lockout & fuel gelling issues at low temperatures
 - HEP Transformer



Ongoing and Planned Amfleet Modifications

- Amfleet Refresh/Pit Stop (FY18/19)
 - Interior upgrades to the Amfleet and Cab Cars to improve the customer experience and boost CSI scores.
 - Amfleet I/II Refresh – New cushions, carpets, curtains, flooring, LED lighting, and restroom deodorizers
 - Amfleet I Pit Stop (Refresh Phase II) – New walk off mats, galley trash/recycling, galley counter tops, galley murals, and ongoing LED lighting installs



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Ongoing and Planned Amfleet Modifications

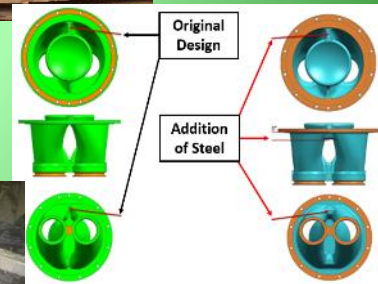
- ADA Handrails and Tray Tables (FY19)
 - Changeover to new ADA compliant handrails in the vestibules and addition of an ADA compliant tray table.
- Amfleet Bathroom Exhaust (FY18/19)
 - Addition of a cleanout access door on the restroom exhaust duct to allow for periodic cleaning to improve restroom air flow and odor control
- Amfleet Battery Box Screen (FY19-22)
 - Installation of a mesh screen in the battery boxes to help prevent leaf ingestion and potential for fires
- Roof Coating (planned FY19)
 - Coating of the Amfleet and Cab Car roofs to prevent roof leaks
- ADA Vestibule Non Skid Coating (planned FY20)
 - Spray application of an improved, slip-resistant material for the vestibule floors



Ongoing GE P32DM/40/42 Modifications

Maintain 3+ Year Fleet Life

- Additions to Quarterly and Life Cycle Maintenance [FY19/20]
 - Electrical switchgear/contactor/air compressor inspections and targeted component replacement on failure data
- Improved Components [FY19]
 - New HVACs, Intercooler seals, Turbo Inlet, Ditchlight Controllers, Horn Heaters
- Aggressive Winterization Campaigns [FY19+]
 - 25 item check of prior modifications
 - Radiator cab snow screens
 - Freeze prevention modifications for turbo and cooling system



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P-42 Replacement Update



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Long Distance Diesel-Electric Locomotive RFP

Vendor will provide all design, development, construction, testing, and long term services (TSSSA) of a rebuilt AC P42-8 locomotive or a new PR11A streamlined passenger locomotive for use in long-distance and intercity corridor passenger service.

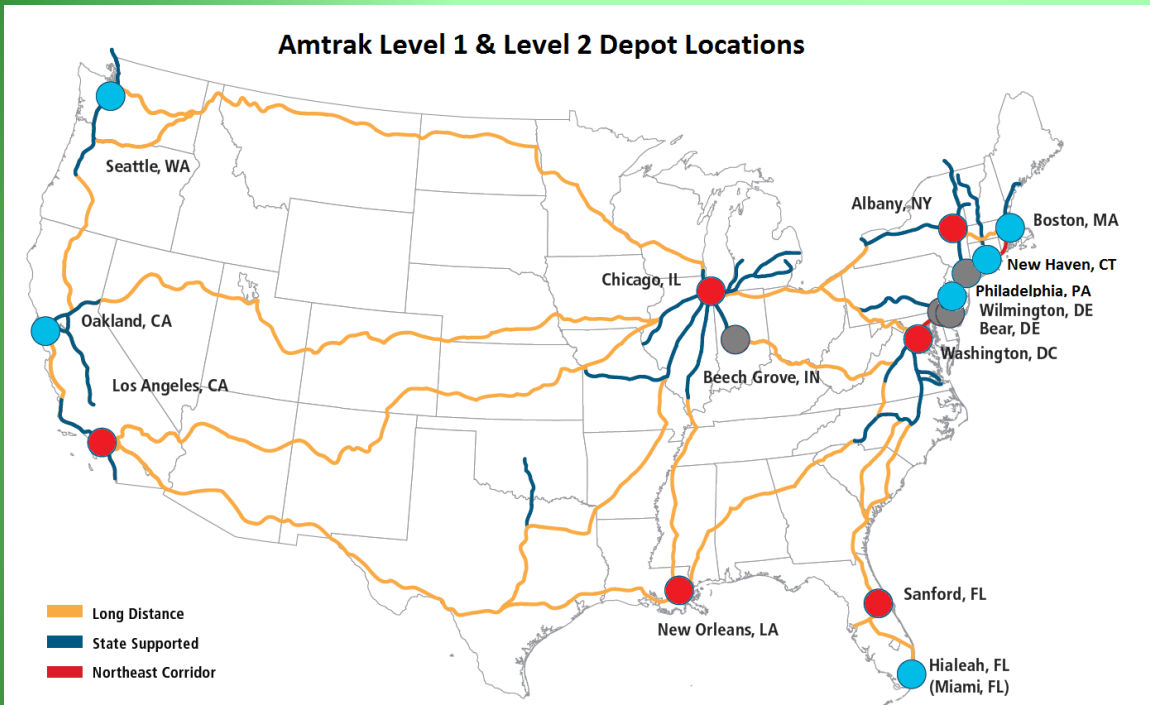
Basic Characteristics	
Speed	110+ MPH
Weight	< 340,000 lbs
Length	< 85 ft
Clearance	AMTK D-05-1355 Rev E
Tractive Effort	65,000 lbs
Tractive Horsepower	800+ Trailing Tons
Head End Power	3-phase 480V, 60Hz, 1000kW
Cant deficiency	< 6 in.
Fuel Tank	≥ 2200 US gal
Tier	4
Service Life	30 years
Maintenance Interval	184 Day

- All North American Environments
- Push-pull, MU (w/Electric) Operation with DTL
- Blended Automatic Braking with ECP
- Desktop Control
- S-580 or CEM
- Crashworthiness
- PTC: 9 Aspect ACSES, IETMS, Provisional ITCS + ATS
- Options for catenary power or DC 3rd Rail power draw



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Locomotive TSSSA RFP



- Proven structure based on prior Amtrak-OEM service agreements
- Commence after Locomotive Warranty Period
- Service Depots – Level 1,2,3
- All Scheduled Maintenance & Overhaul Material [kits]
- Material Storage on Amtrak property
- Technical Support – Hours differ per Depot
- Electronic Manuals & Documentation Control
- Staffed Remote Service Desk
- Locomotive Diagnostic System and Predictive Analysis

Long Distance Diesel Replacement Procurement

- Diesel RFI 2017 & Specification Development
- Diesel RFP Issued June 1, 2018
- Service Agreement (TSSSA) SOW Issued June 22, 2018
- Proposals Received August 23, 2018
- Scoring Complete November 1, 2018
- Award Announced December 21, 2018



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Amtrak's Selection Decision is



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Amtrak Long-distance Charger (ALC42)

Item	Data
Locomotive type	High-speed passenger locomotive with full width locomotive carbody
Power type	AC Diesel-electric
Crashworthiness	Incorporated CEM and AAR-S-580 Crashworthiness
Gauge	4 ft. 8 1/2 in.
Wheel diameter (new/worn)	Up to 44" / down to 41" (3 inch maximum wear)
Minimum curve radius	250'
Wheel base	118 1/8 in.
Wheel arrangement	Bo'Bo'
Length over coupler	71 ft. 10 in.
Width	10 ft. 2 in.
Height	14 ft. 7 in.
Clearance/Envelop	AMTRAK Clearance diagram D-05-1355
Locomotive design weight	267,000 lbs. (depending on optional equipment)
Top speed	125 mph
Engine	Cummins QSK 95 (16 cylinder – 4 stroke locomotive Tier 4 Diesel engine)
Power output	4,200 hp continuous
Emission standard	US EPA Tier 4 line-haul locomotive
Engine speed range	600 rpm – 1,800 rpm
Fuel tank volume	2,200 gallons
Tractive effort	65,000 lbs. (290 kN) (starting)
Head end power (HEP)	1,000 kW available with 10% over load capacity, 3-phase 480 V / 60 Hz at low temperatures



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Modifications in a nutshell

SMI and SMO

Systems

- **HEP 1,000 kW** continuous + 10% overload – incl. new HEP transformer and changes of HEP rack and cabling
- **PTC/ATC:** new combination ACSES/I-ETMS/Cab Signaling, ITCS and IITS provision (=space and cabling) incl. truck/carbody/MR/cab/cabling/roof modifications
- **Battery charger** redundancy
- **Software changes:** diagnostics, Trainlines, ACS, Overspeed selection switch – adjustability
- **Winterization package:** heated sand nozzles, Kim Hotstart with coolant/oil heater, brake resistor improvements, compressor oil heating, incl. truck/carbody/MR/cab/cabling/roof modifications
- **184 day maintenance interval:** fuel filtration (doubling filtration capacity), lube oil volume with external tank&pump incl. truck/carbody/MR/cab/cabling/roof modifications
- **Brake System** Adaptation needed for Amtrak operation / PTP module
- **Head of Train Device:** Integration of provisions – “Plug and Play” -ready
- **Cab console:** additional control elements
- **Cab radio:** Ritron clean cab radio
- **ECP brake provisions:** as ACS-64 prototype
- Additional **74 V DC receptacles** outside for battery charging
- Additional **AC receptacles** inside machine room
- Additional **EFCO** control element in the rear E-compartment
- **RAMS** Plan and Demonstration

Mechanical

- Amtrak **paint scheme** and decals
- Several car body modifications (SMI and SMO)
- **Front nose:** replace welded design with bolt-on solution
- PTC/ATC antenna interfaces carbody and support
- **Larger front plow** with 3rd rail cutout
- 2,200 gallons fuel tank plus strainer for fill pipe
- Increased sand boxes (5 cf. – 6.5 cf.)
- electronic device lockbox in cab
- foam head bump blocks
- Cab FRP lining changes for PTC/ATC provisions
- **Compatibility study** for coupler and cables incl. clearance (dyn. and static)

Amfleet I Replacement Trainset Procurement

- Trainset RFP Issued 1/18/19
- Service Agreement (TSSSA) SOW issued 2/8/19
- Pre-Proposal Meeting Scheduled for 2/26/19
- Exhibits N & O due 3/15/19 (Exec summary of Equipment, Maintenance & Facility Requirements)
- Proposals due 5/1/19
- Evaluation during summer 2019

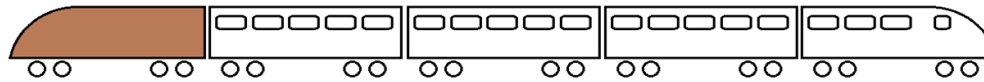


Amfleet I Replacement Trainset Procurement

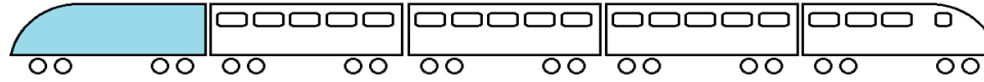
Potential Integrated Trainset Configurations for a Train with Four Passenger Cars

Can use **diesel**, **electric** or **dual-powered** propulsion

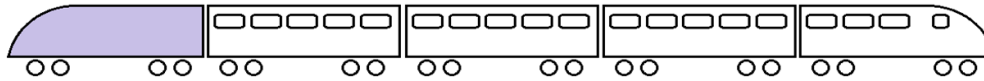
Hauled by Diesel Locomotive



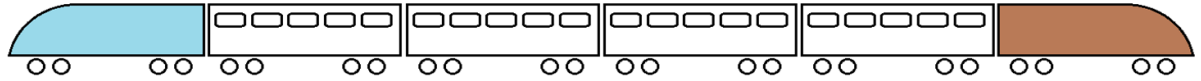
Hauled by Electric Locomotive



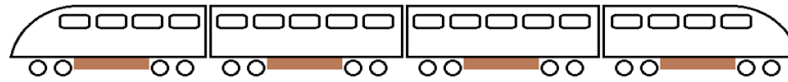
Hauled by Dual-Mode/
Dual-Power Locomotive



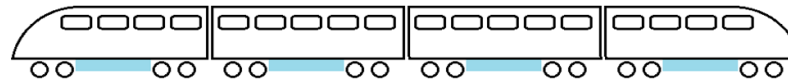
Diesel and Electric Locomotives



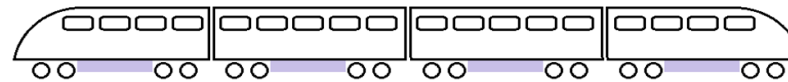
Diesel Multiple Units
(Self-Propelled)



Electric Multiple Units
(Self-Propelled)



Dual Powered Self-Propelled



*Cab control coaches
enable operation of
the train from either
end*



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Acela 21

2018 Review
2019 Plan



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Acela 21: 2018

2018:

- First power car and nine passenger vehicles arrived at Alstom's facility in Hornell.
- Completed passenger vehicle compression tests.
- Completed majority of Final Design Reviews.
- Completed 15:45 First Article Inspections.



Compression Testing PV6



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Acela 21: 2019

2019:

- Completed Power Car Compression Tests
 - (January 2019)
- Completed Final Design Reviews
 - (January 2019)
- Preliminary Maintenance Plan
 - (~ April 2019)
- Complete First Article Inspections
 - (~ May 2019)
- Complete Trainset 1 testing at Hornell
 - (~ August 2019)
- Commence Trainset 1 testing at TTCi/Pueblo
 - (~ September 2019)
- Commence Trainset 2 testing on the NEC
 - (~ December 2019)



Artist Rendering of Acela21 Trainset



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