



SP&S 700 and the Pacific Railroad Preservation Association NMRA Clinic

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PRPA Mission

The Pacific Railroad Preservation Association (PRPA) is a non-profit , all volunteer organization with a mission to restore, maintain, and operate the Spokane, Portland and Seattle (SP&S) steam locomotive #700 and related historic railroad equipment for the purposes of preservation, education, public display, and community service, including the promotion of railroad safety.



PRPA History (Overview)

- 1984: PRPA founded
- 1985: 5 year program to restore SP&S 700 to operation was begun
- 1990's: various excursions to Eastern Washington and throughout Oregon.
- 2000: Boiler rebuilt
- 2001-2002: Major excursions to Eastern Washington and Montana
- 2003: Inaugural runs along Springwater Trail with 4449
- 2005: Double header to Wishram with 4449
- 2006: Safety Faire in Salem. Achieved status on National Register of Historical Places
- 2007-2009: Focus on activities on OPRR and Holiday Express
- 2010-2011: Work on running gear
- 2012: Move from Brooklyn Roundhouse to the Oregon Rail Heritage Center (ORHC)
- 2012- current: National Train Day, Holiday Express, BNSF Santa Train, Lerro Production Charter
- 2016: Begin 15 year rebuild project



SP&S 700 History

The *Spokane, Portland and Seattle Railway* was built by James J. Hill and completed in 1909. It was jointly owned by the Great Northern and Northern Pacific and provided a route between Portland and Spokane for those railroads. For years the railroad operated with hand-me-down power such as 4-6-2 Pacifics from the GN and NP. In 1937, there was an anticipated increase in traffic, justifying the purchase of more modern motive power.

The *Spokane, Portland & Seattle Railway's 700* was built by the Baldwin Locomotive Works in 1938. The height of proven steam locomotive technology, it headed fast passenger trains and fast freights to and from Portland until 1956 when it was replaced by Diesels.

The 700 and its sisters 701 and 702 were regular power on the Portland-Spokane sections of the Empire Builder for the Great Northern, and North Coast Limited for the Northern Pacific.



The 700 is A 4-8-4 (Northern) design, built by Baldwin to sister railroad (and one of the SP&S owners) Northern Pacific specifications. The engine started on the production line as a Northern Pacific A-3 with the main difference and change being the conversion to oil for fuel instead of coal. These became class E-1 locomotives on the SP&S.



SP&S 700 History

In 1947, GN and NP dieselized their passenger trains, and the 700 and her sisters were relegated to secondary passenger service, with trains such as the Oriental Limited (later named the Western Star) and the Alaskan (later named the Mainstreeter)

By 1954, SP&S finally dieselized its secondary passenger trains and the 700 was moved to freight service. In 1955 after close to 2 million miles of service, the 700 was considered for retirement even though she had many more years of useful life remaining.

The final big show during 700's service with the SP&S was the Farewell to Steam excursion between Portland and Wishram, on May 20, 1956, pulling 21 passenger cars.



The 700 was donated to the City of Portland in 1958, and with two other steam locomotives, was displayed in Oaks Park. Exposed to the elements and with no cosmetic maintenance for a quarter century, the 700 was sad remnant of steam railroading. In 1985, the PRPA began its five-year effort to restore it to running condition. Steam returned to her boiler in 1990 for the first time in 34 years.



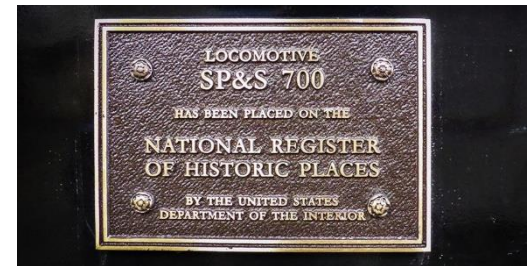
SP&S 700 Specifications

Length with Tender	110 feet, 7 inches
Height at Stack	16 feet, 10 inches
Weight on Drivers	296,500 pounds (148 tons)
Locomotive Weight	485,820 pounds (243 tons)
Total Operating Weight	879,700 pounds (440 tons)
Tractive Effort	69,800 pounds
Boiler Pressure	260 psi
Drive Wheel Diameter	77 inches
Maximum Road Speed	90+ mph
Tender Water Capacity	20,000 gallons
Tender Fuel Capacity	6,000 gallons
Fuel (during original service)	Bunker C fuel (heavy oil)
Fuel (current service)	Re-refined waste oil (RFO)
Fuel consumption (average)	15 gallons per mile
Water Consumption (average)	150 gallons per mile



SP&S 700 Interesting Facts

- **#1:** Largest operating steam locomotive in U.S. (#2 is AT&SF 3751)
- **#1:** Heaviest operating steam locomotive in U.S. (#2 is N&W 611)
- **#1:** Longest (dimensionally) operating steam locomotive in U.S. (#2 is SP 4449)
- #2 most powerful operating steam locomotive in U.S. (#1 is N&W 611)
- First U.S. steam locomotive to be subject to the new FRA rules governing boiler life
- One of **three** steam locomotives owned by the city of Portland
- Has operated under steam for **25** years since restoration under PRPA stewardship. The 700 was only in service on the SP&S for **17** years
- The 700 is on the National Register of Historic Places!
- Fuel: uses re-refined oil instead of Bunker C
- Unique design: Firebox designed for coal burning
- Bearings: Roller bearings





Description of Rolling Equipment

- SP&S 700
- Auxiliary tender
 - Restoration complete
- Crew car
 - Interior enhancements under way
 - Used in local operations, non-Amtrak excursions





Funding Sources

- Funds are that allocated to equipment upkeep
 - Membership dues
 - Donations
 - Souvenirs
 - Operational/Charter fees
 - Grants
 - Employer matching programs





PRPA Activities

- Operations: Holiday Express, BNSF Santa Train, various excursions
 - handled by other parties (ORHF, BNSF, OPRR, Charter operators)
- Operation Lifesaver
 - Board Member Matt Baccitich is Oregon OL Chairman
 - Involvement in many OL events and activities
 - Manage Oregon OL trailer
- ORHF involvement
 - Steve Sedaker ORHF Board Member
 - Membership in various ORHF committees (C. Harrison, S. Sedaker)
- Support of Amtrak
 - National Train Day and other Amtrak local activities





Relationships

- Oregon Rail Heritage Foundation (ORHF)
 - Member organization
 - Committee involvement
 - Board involvement
- Friends of the 4449, Friends of the 197, PNW Chapter
- Operating Railroads
 - OPRR, BNSF, UP, Amtrak
- Local companies
 - Providing us labor, materials and financial support
- Non-member individual support





Oregon Rail Heritage Foundation

- Founded by Doyle McCormack and others
 - Originally formed to find a long term home for the SP 4449, SP&S 700 and OR&N 197
 - Effort driven by need to eventually vacate the Union Pacific (ex-SP) Brooklyn Roundhouse
- Fundraising activities resulting in securing funding for property and a building
 - Supported by donors and members
 - Key support by City of Portland, actual owners of the 3 locomotives
 - 501C3 organization





Oregon Rail Heritage Center

- Facility completed and moved into by September 2012
 - Home to the 3 locomotives and supporting equipment including the Holiday Express consist
 - Working museum
- All-Volunteer organization
 - Supported by member groups and outside volunteers
 - Organized by various committees
- Financially healthy and stable
 - Expansion planning under way
 - Debt retirement within sight!





Operations in 1990's

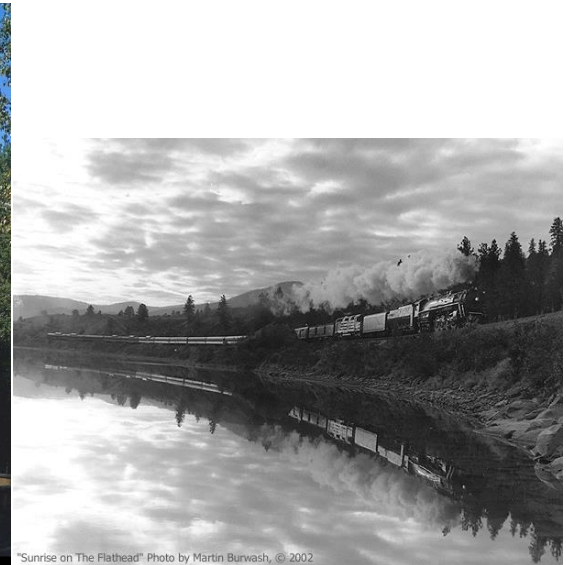
- Inaugural Trips Wishram
- Eastern Washington Trip to Pasco and Cle Elum
 - Washington Central (Steamfest)
- Local Trips on Portland and Western





Operations 2000-2002

- 2001
 - 4 Day Spokane Trip
- 2002
 - Montana Trip
 - Montana Rail Link
 - Sandpoint, ID to Billings, MT





Operations 2003-2005

- Springwater Trail Inaugural runs in 2003
- First BNSF Santa Train in 2004
- Big happenings in 2005
 - Salem Safety Faire
 - NRHS 2005 Convention with Western Star excursion to Wishram, featuring 700 and 4449 Double Header operation
 - First Holiday Express, with 700 and 4449 Double Header





Operations 2006-2012

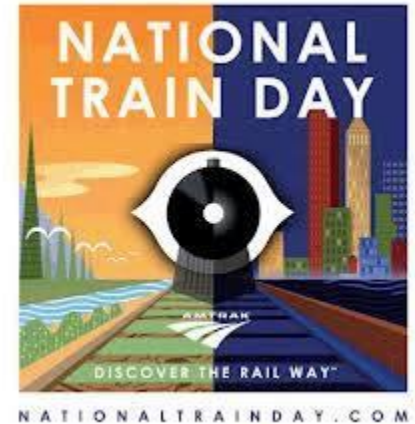
- Salem Safety Faire (2006)
 - Deadhead moves to and from Salem from Brooklyn on P&W
 - Display under steam at Salem, OR waterfront
- OPRR Summer runs
 - June, 2006-2008
- Holiday Express
 - Alternating weekends with 4449
- BNSF Santa Train
 - 3rd weekend of December





Operations 2013 to current

- National Train Day
 - May 2013 and 2014
 - Under steam and on display at Portland Union Station
- Holiday Express
 - November and December
 - All 3 weekends starting in 2013
 - Sole operating engine due to 4449 15 year rebuild
- BNSF Santa Train
 - 3rd weekend of December
- Lerro Charter
 - October 2014



- **4 weekends of operation November- December 2014!!!!**



National Train Day

- First solo participation by SP&S 700 was in 2013
- Record crowds of over 7000 people
- Event was totally volunteer supported
 - PRPA, Friends of the 4449, Friends of the 197, PNW Chapter NRHS, ORHF, AORTA, Willow Creek RR, and more





Holiday Express

- Only operating engine for entire Holiday Express in 2013 and 2014
- 3 weekends in a row!





BNSF Santa Train

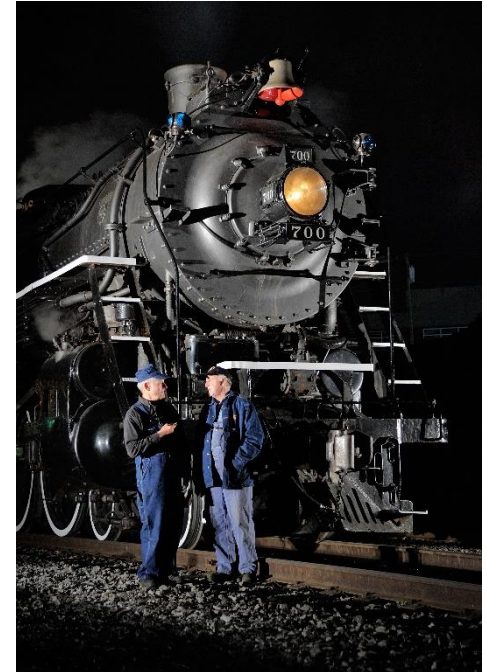
- Annual event in support of BNSF holiday community event in Vancouver, WA
- Several thousand in attendance every year, increasing attendance on a year to year basis
- BNSF went real big this year with catered food, etc.!





Lerro Productions Charter

- Static photography and run-bys
- Included day and night photography
- Used ORHC facility, as well as adjoining OPRR





Preparing the 700 for Operation

- Annually: Hydro Test
 - Clean out the smoke box
 - Drill out all of the stay bolts in the firebox and clean out the firebox (as well as check bricks for cracks and looseness)
 - Perform test, check for leaks, FRA certifies operation
- Before steam up prep
 - Reattach any appliances or other components that may have been removed
 - Clean up cab
 - Clean and polish the rods
 - Fill tender with fuel and water





Start up

- Feed boiler with steam
 - Utilizing the ORHF steam generator car “Little Boy”
 - Primes the boiler with a low level of steam
 - The key is to bring boiler pressure up very slowly, gradually
- Initial fire up
 - Activate fuel flow to engine from tender
 - Remove stack cap
 - Set various valves into position
 - Set dampers
 - Initiate fuel flow at firing valve
 - Light off





Start up

- Gradually build up boiler pressure
 - Periodically add water to boiler through injector
 - Turn on dynamo to provide electrical power (switch off external power)
- Engineer arrives
 - Additional checks around engine
 - Turn on air pumps
 - Check brake system operation
 - Safety valves test (there are 3), then maintain pressure just under 260 psi
 - Ready for brake test
- Lubrication (after steam up and every ~100 miles)





Recent Completed Work Projects

- Repair of lateral motion devices
- Tender brake rebuild
- Aux tender rebuild
 - Rocky the Goat (GN) herald applied
- Repair weld on the smokestack
- Trailing truck rebuild
 - Springs and structure are done
 - Finish up trailing truck brakes
- Tender coupler adjustment
- Work resulted in acceptance for Amtrak operation





Work Projects post 2015

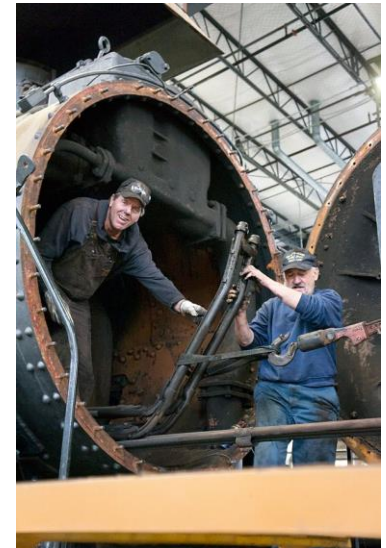
- Number one driver lateral motion device repair
- 15 Year FRA mandated full inspection work
- Air compressor rebuilds





What's Next

- Pending (boiler extension application):
 - Tri-Met Orange Line Grand Opening
 - Possible 700 under steam and on display
 - Holiday Express
 - Maybe one weekend with the 700 this year?
 - BNSF Santa Train
- 2015 Boiler rebuild advanced prep
 - Actual work to start January 2016





Future Challenges

- Upcoming 2016 boiler rebuild work
 - Will we find any surprises?
- Expanding and increasing memberships
 - Maintains a fan base
 - Provides a source of maintenance funds
- Attracting new and younger crew members
- Securing funding sources for capital intensive projects
- The ability to get out and operate on main line railroads
- Creating opportunities to get the 700 in steam more often for charters and community activities
 - It costs \$\$\$ to steam up a 4-8-4 Northern!





Thank you!

www.sps700.org