ROSE CITY GARDEN RAILWAY SOCIETY

NEWSLETTER

See our Web page at http://www.rcgrs.com/

June 2006

Dennis & Carolyn Rose's Open House

The weather was glorious on May 13th for an open house at the Rose's. (It was also Dennis's birthday,) When we met at the Rose's last year, Dennis had just laid track for his logging railroad extension. This year the track ballast has settled, the bridges are installed, and there are a number of beautiful new buildings on the site. Chief gardener, Carolyn Rose, had the "garden" looking great.

The new buildings include a sawmill and a water tower

Frank Filz, Don Watson, Bud Quinn and Dennis Rose ponder a point in the railroad

An impromptu class in the kitchen for making small art books.

Part of the main town

Happy Birthday Dennis Rose

Quarterly Meeting Notes

There was a brief quarterly meeting of the RCGRS during the afternoon at the Rose's. Most of the discussions were about calendar dates that have now been added to the "Schedules and Timetables". The following items were discussed:

July 22 & 23 – Tour of Layouts (6 homes each day) Need at least 3, prefer 6, volunteers per home.

Aug. 13 – Auction @ Bill Derville's house. Christine will coordinate an on–line pre–bidding for the auction items.

Sept 10 – Next quarterly business meeting

Sept 17 – Gary Lee's Open House

Sept 30 – Tom Miller's Open House

Nov. 11 – Banquet (Carolyn, Penny and Barbara Clark will handle details). Carolyn has confirmed

and tentatively held November 11 date at the East–Mooreland Golf Club.

Module Committee – Work needs to be done on the old tables.

Club Store – Margaret Kooken is staffing our stores. If you would like any items please contact her direct. Regarding a new shirt supply order Margaret will check with Dennis Peoples on art–work, etc. and then an ordering process will be discussed.

Education Chair – Christina Brittan – Christine will present a garden railroad "Show N Tell" topic at each meeting

Members are requested to wear name tags and at the Banquet there will be a drawing for members that have continually displayed their name tag at every event. Christina will make new badges for all members.

Visitors/New Members:
Steve Parker
Gary Bridge (New member)

The GM–EMD Diesels

The origins of what were to become EMD were in 1922, when H. L. Hamilton and Paul Turner founded a company they called Electro–Motive Engineering in Cleveland, OH. The next year, the company sold only two gasoline–powered rail motor cars, one to the Chicago & Great Western and the other to the Northern Pacific. They were delivered the following year, and worked well; fortunately for the fledgling company, because the sales were conditional on satisfactory performance. The next year, 1925, the company changed its name to Electro–Motive Corporation and entered full–scale production and sold 27 railcars.

In 1930, General Motors, seeing the opportunity to expand into a new field ripe for the picking, purchased the company and also its engine supplier, Winton Engine. GM's Charles F. Kettering was convinced that GM could eventually build a powerful diesel engine that was light enough to fit in a railroad carbody. Advancing from railcars, the company began building light weight multi–car diesel Zephyrs for the CB&Q which were a resounding success. Winton had also developed a V–12 distillate engine which GM redesigned into a diesel version designated V–12 201A. Some of the later Zephyrs used this more powerful V–12 diesel.

But passenger trains were a marginal profit maker (if at all) for the railroads and GM looked hungrily at the "meat and potatos" of the railroad business—the freight service. By 1935, GM felt confident enough to invest in a brand new factory in La Grange, IL. By the end of the 1930s, EMD had a diesel engine powerful and reliable enough for road locomotive use; the **EMD 567**. The first three locomotives produced by EMD were 100 ton 600 hp switch engines using Winton 201A engines in either an inline–8 or a V–12 configuration The Winton designed engines were used in the switch engines built between 1935 and 1939.

EMD E2 "City of Los Angeles

GM brought its expertise in standardization and assembly line procedures to locomotive production. For example, all the various models of EMD switchers had a standard length of 44'–5" which was in effect until 1966. Some people claimed that the only options that EMD offered on their locomotives was a choice of paint scheme. The benefits of standardization are more easily obtainable parts and economies of mass production.

The next three locomotives were passenger locomotives which had two Winton V–12 diesels in the same car body; which developed into the "E–unit" series. Two sets of A–B–B E2 passenger locomotives were built in 1937 for a joint train operation for the CN&W, UP, and SP (*City of San Francisco* and *City of Los Angeles*). Each E2 unit produced 1800 hp (originally, "E" meant 1800 hp). Two of these units coupled together produced a tractive effort of almost 120,000 lbs; whereas the average tractive effort for a passenger steam locomotive in 1935 was about 36,000 lbs.

In 1939, EMD produced a multi–unit freight locomotive demonstrator, the EMD FT (F=freight, T=twenty–seven hundred horsepower), and began a tour of 20 of the continent's railroads to demonstrate it. The tour was a success; Western roads in particular saw their prayers answered by the FT of freeing themselves on their dependence on scarce, expensive desert water supplies for steam locomotives. By 1940 EMD was producing a locomotive a day and had reached 600 in service.

GM–EMD #103 FT Demonstrator AB Set of "Motors" Built in 1939.

The EMD 567 succeeded the Winton 201A, and was used in EMD's locomotives from 1938 until its replacement in 1966 by the EMD 645. It had a bore of 8 1/2 inches (216 mm) and a stroke of 10 inches (254 mm), and a displacement of 567 cubic inches per cylinder. Like the 201–A and the EMD 645, the EMD 567 was a two–stroke cycle engine. It was a V engine with an angle of 45 degrees between cylinder banks. The engine was produced as V–6, V–8, V–12, and V–16 versions. A surprisingly large number of switch engines built during 1939–1941 used the V–6 567. Many of the earlier production locomotives had their Winton diesels replaced by an equivalent EMD 567.

The Second World War temporarily stopped EMD locomotive production. The EMD 567 diesel engines were instead required in Navy subchasers and LSTs; but in 1943 production of locomotives were restarted. More locomotives were needed to haul wartime supplies. The war, however, was in the end a godsend for EMD. While it was allowed to continue to develop the diesel locomotive and to sell it to railroads, its competitors in the locomotive industry — principally the American Locomotive Company (ALCO) and the Baldwin Locomotive Works — were prohibited from any work with diesel locomotives. They were instead ordered to produce steam locomotives to pre–existing designs, as fast as they possibly could. This delayed EMD's competition and dealt them what was in the end a fatal blow. By the end of the War, EMD's diesel production was in full swing, with a new improved freight locomotive in production, the EMD F3, as well as new passenger E–Units.

1947: EMD locomotive production is 5 locomotives per working day.

1949: The first GP7 (General Purpose), 1500 hp, is delivered to C&NW. This locomotive was considered so ugly in appearance that many at EMD doubted it would even sell. Here was a locomotive that could do everything, and the railroads bought many of them including the 1800 hp GP9. Called a road switcher type, its design was that of an expanded diesel switcher, with the diesel engine, main generator and other equipment in a covered, but easily removed, hood (thus the other name for these locomotives, hood units). This hood, being narrower than the locomotive, enabled the crew to have visibility in both directions from a cab placed near to one end. Some railroads had steam genera-

tors installed in the shorter high hood so that these locomotives could pull passenger coaches. The structural strength in the road switcher was in the frame, rather than in a stressed carbody in earlier locomotives. The maintenance ease of this new type of locomotive won over the railroads in short order — faster, indeed, than EMD truly expected. While there are many low production and experimental exceptions, most freight locomotives produced in the United States for domestic use since the 1960s have been hood units.

GP7

1952: The first 6–axle SD7 (Special Duty) heavy drag locomotive is sold. The SD7 is similar in appearance to the GP7, but has an extended frame to accommodate the 6–axle trucks.

1954: EMD produces its 15,000th locomotive.

1959: Turbocharging is added to the 567 engine in the SD24 locomotive delivered to the CB&Q.

By 1960, dieselization of American railroads was effectively complete. The U.S. railroads have replaced their fleet of 60,000 steam locomotives with 28,000 diesel–electrics. EMD had won. The 1960s saw EMD consolidate their position as the dominant locomotive builder in the USA; new, high power locomotives, like the 3000 horsepower EMD SD40 and the 3600 horsepower EMD SD45 were produced and proved highly successful.

1965: EMD produced (at insistence of the Union Pacific) the longest (98'5") and most powerful diesel–engined locomotives to date; the 8–axle, double diesel, 5,000 hp DD35A and in 1969, the 6600 hp DD40AX Centennial locomotive.

DD40AX

In 1972, EMD introduced computer control systems with the 'Dash–2' line; the EMD SD40–2 became possibly the most successful locomotive design in history. 3,945 were built; if the other SD40 class locomotives are included, a total of 5,752 were produced. The vast majority are still in service on American railroads. Later, in the 1980s, EMD's computer control systems on locomotives became more advanced, with computer controlled wheel slip prevention among other systems.

SD70–2

1983: EMD produces it 50,000th locomotive.

1988: EMD replaces the 645 engine with the 710 which would power the new SD60MAC, SD70MAC series of diesels. The early 1990s saw EMD introduce two new innovations; AC electric transmission for increased reliability and tractive effort at low speeds, and the radial steering truck which reduced wheel and track wear.

1999 saw Union Pacific place the largest locomotive order in history for 1,000 of the EMD SD70M locomotives.

SD70MAC

The decade also saw locomotives increase in power to 6000 horsepower from a single prime mover, in the EMD SD90MAC–H locomotive (EMD's first 4–stroke diesel). The 1002 cubic inch/per cylinder, 16–cylinder "H" engine has had reliability problems and its development is continuing.

2001: The future of railroading changes as EMD introduces a new service to monitor the health of locomotives. intellitrain ™ connects the locomotive to the internet to monitor real time performance.

2004: Cash strapped GM puts EMD up for sale and is purchased by Greenbriar Equity LLC and Berkshire Partners LLC. The newly spun–off company is called Electro–Motive Diesel, Incorporated, which retains the EMD brand that is so widely known in the railroad industry. The sale closed on April 4, 2005.

2005: China purchases 300 6,000 hp (SD90MAC–H) locomotives in a joint technology and manufacturing development and to be built in Dalian, China.

EMD Engine Series

There have been three successive series in the EMD line: the 567 series, the 645 series, and the 710 series. The numbers refer to the number of cubic inches per cylinder, with a typical engine having 16 cylinders (for a total displacement on the order of 10,000 cubic inches!). When you consider that a 5–liter (305–cubic–inch) engine is considered to be very large in an automobile, you can see that one of these EMD engines is massive!

Editor's Note: I am continually amazed that such a large and complex engine block can be successfully cast in steel. It is truly a monument to the art of metal casting.

Here are some of the specifications for the EMD 645E3 engine:

* Cylinder diameter – 9–1/16 inches
* Piston stroke – 10 inches
* Displacement per cylinder – 654 cubic inches
* Number of cylinders – 16 or 20
* Compression ratio – 14.5:1
* Exhaust valves per cylinder – 4
* Engine weight –
    - o 16 cylinders: 34,526 pounds / 15,661 kg
    - o 20 cylinders: 40,144 pounds / 18,209 kg
    - (The oil pan alone weighs over a ton!)
* Idle speed – 315 rpm
* Full speed – 900 rpm

A typical horsepower rating for one of these engines is 4,300 hp! The 20 cylinder engines often have a problem with harmonic breakage in their long crankshaft. These engines are often derated to a maximum of 750 rpm.

It must be recognized that only 25 to 30 percent of the energy generated within the engine is converted to mechanical energy. The remaining 70 to 75 percent of the energy must be dissipated as heat. For example, 4,300 hp of mechanical energy output converts to approximately 3.207 megawatts. If we remember the diesel cycle, it would indicate that at least 10 megawatts of heat energy must be dissipated from the engine. This is enough heat to keep 341 medium sized houses warm on a cold day. This is so much heat that special cooling systems must be installed on locomotives that go through long

tunnels. Without these special cooling arrangements, the locomotives would automatically shut down from over heating.

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Schedules & Timetables

Make sure you check the calendar on our Website at **http://www.rcgrs.com/** for the most up–to–date schedules and timetables.

Anyone interested in having an Open House or sponsoring an event, please contact **Donald Golgert at 360–896–1778 or grammabob@wa–net.com**. A goal for 2006 is to always have one open house or event on the second Saturday of the month. The other events or open houses can "float" on any of the dates in the month.

June 10, 2006, Saturday: Track laying party at Steve & Mimi Cogswell's, 17520 Holly Lane, Oregon City, 503–650–4682

July 3 – 9, 2006, National Garden Railway Convention, Santa Clara, California:
Web Site: www.bagrs.org/convention/index.html

July 22, 2006, Saturday 12:00 p.m. to 6:00 p.m., RCGRS Summer Tour (Portland area): Coordinator is Bill Derville. Help is needed from all members.

July 23, 2006, Sunday, 12:00 p.m. to 6:00 p.m., RCGRS Summer Tour (Vancouver area): Coordinator is Bill Derville. Help is needed from all members.

August 12, 2006, Saturday: Open house at Bill and Brenda Derville's. The annual auction is planned for this date.

August 26th, Saturday, 1:00 p.m. – 5:00 p.m.: Glen & Judy Wadley, 5170 High St, Bay City, OR. 503–377–2685 Let's all head for the coast this weekend to see and play with Glen's fine layout. Track power, so bring your electric and steam powered engines. Details and map will be in a later issue of the Newsletter.

September 9 – 10, 2006, Saturday and Sunday: Open house at Jeff Lange's. Third Quarter business meeting on Sunday.

September 17, 2006, Sunday: Open house at Gary and Jonette Lee's.

October 14, 2006, Saturday, 4 – 9 p.m.: Open House at Shannon and Millie Pratt's.

October 28, 2006, Saturday, 4 – 9 p.m.: Open house at Allan & Kathryn Warrior's. Halloween trains and night themes.

November 11, 2006, Saturday, 4:00 p.m. until 10:00 p.m. RCGRS Annual Banquet at the East Moreland Clubhouse. Carolyn Rose, Penny Walker and Barbara Clark are in charge of the details.

December 8, 2006, Friday: Open house at Jan & Rae Zweerts'. (Christmas Ships)

Editor's Note: The deadline for the July newsletter is June 25, 2006.