INTRODUCTION TO BULK GRAIN HANDLING

By: Dan Holbrook

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Late 1800's – Grain begins to be moved by rail from local elevators to milling and distribution points. Early rural elevators are constructed of either "cribbed or "studded" construction. (Cribbed elevators were built by laying 2x20, 2x8, 2x6 or 2x4's, flat in a rectangle or square and held together with metal spikes. Walls interlocked like "Lincoln Logs") (Studded elevators were balloon frame constructed and looked like cribbed elevators except there were horizontal bands made of wood that had tied rods mounted on the exterior extending through the elevator to the opposite side)Most stand 65 to 75 feet tall, but some in North Dakota and Canada reach 110 feet. Most rural elevators are covered with metal siding or asbestos in an attempt to protect them from fire. Average life span of wood grain elevators is eleven years. Urban wood elevators are constructed of wood until the end of the nineteenth century. All urban wood elevators are built with "cribbed" construction and are 300 to 375 feet long by 120 to 130 feet tall.

1890's – Some rural elevators are constructed of brick.

1895 – Some rural and urban elevators are constructed of steel encased with brick or wood. Reduced cost of construction but had problems with insulation.

Early 1900's – Most of the grain in the U.S.A. and Canada is trucked a short distance from local farms and loaded into boxcars for further movement to larger elevators for storage or for milling into flour or feed. Grain is being hauled in 36 ft and 40ft wooden boxcars.

1900-1915 – Tile is used briefly for grain elevator construction during these years. Most are built in Kansas and Nebraska.

November 1911 – Standard Temporary Grain Door is developed and approved for use.

1915 – Concrete becomes the material of choice for construction of urban elevators. Construction of rural concrete elevators quickly follows.

November 1934 – Some of the Western railroads (CB&Q, UP, MP, ATSF, MILW) make further revisions to the AAR Standard Temporary Grain Door. WWIB takes over the coopering, accounting and reclaiming of grain doors for member RR's

November 1938 – AAR Standard Grain Door is approved for use nationwide (See following reprint for additional information)

1940 – Steel bins become popular as additions to rural elevators. Many of these are supplied by U.S. Government to assist in storing the enormous amount of surplus grain.

1948 – Signode Corp of Chicago develops the first "Paper Grain Door" to replace wooden grain doors. By Feb 1949 over 250,000 carloads of bulk commodities have been shipped using paper grain doors

Mid 1950's – Ford Grain Door (later International Stanley) introduces a paper grain door

1958 – Completion of the St. Lawrence Seaway shifted grain movement destined for Buffalo and other Eastern Ports to the inland ports of Duluth, MN, Superior & Milwaukee, WI and Chicago, IL. Shorter rail haulage of grain results in better car utilization.

1960 – Southern Railway purchases the "Big John" fleet of covered hoppers.

1961 - Southern approaches ICC to lower the rates for movement of grain in "Big John" cars in groups of four or more cars to certain gateways (Memphis, St.Louis, and Cairo, IL) Cargill establishes "gateway loading" point of Princeton, IN for shipment to Southeast points. "Big John" cars are used for this movement. The establishment of multiple car shipment rates for the movement of grain forever changes the way railroads haul grain.

1964 – ACF introduces 4600 cubic capacity covered hopper. Pullman Standard introduces 4427 cubic capacity covered hopper. These two cars begin the change from 40ft boxcars to covered hoppers as the standard for loading bulk grain

1965 – Many railroads see the advantage of hauling grain in covered hoppers covered by the multiple car rates and begin to order covered hopper for dedicated grain service. Covered hopper orders swell from 1965 to 1975 as railroads begin to replace the ubiquitous 40ft boxcar

1966 to 1980 – Interstate highway system, larger trucks and more paved roads increase ability of farmers to drive longer distances to centrally located elevators. Many small town elevators close or merge and build larger, centrally located grain elevators.

1967 – Illinois Central develops the Rent-a-Train (RAT) concept. Cargill builds first facility at Gibson City, IL for unit train movement of grain to Baton Rouge, LA.

1968 – Cargill builds a second unit grain train loading facility in Tuscola, IL, with a third planned for Clinton, IL., but was not built

1970 – Unit grain trains begin to come into vogue on other carriers.

1971 – Omni Corp and Menasha Corp both introduce paper grain doors. Menasha grain doors are widely used by C&NW to haul woodchips from South Dakota to Wisconsin in 40ft boxcars

1972 – Russian grain movement taxes ability of railroads to move grain. Ice reefers, stock cars and open hoppers are used to haul grain until the early 80's. Some railroads resort to rebuilding 40ft boxcars for restricted weight branchline use.

1973 – Many larger rural grain elevators begin to build longer tracks and larger concrete elevators to accommodate loading of blocks of covered hoppers. To assist in the process some buy their own locomotives for movement of cars during loading.

1980 – WWIB discontinues accounting for wooden grain doors.

1981 – Majority of grain moving in U.S. is now in covered hoppers. Exceptions with light weight branchline track still exists on BN and CNW.

1982 – 40 ft boxcars become extremely rare in "grain service" in the U.S. Major use of 40ft boxcars in Canada is on many of the prairie branchlines in Alberta and Saskatchewan.

1984 – Last run of 40ft boxcars in grain service on **weight restricted** branchline trackage in USA takes place on BN Mansfield, Washington branch. Small numbers of 40ft boxcars continue to be loaded with grain on C&NW and BN until 1987

1995 – Majority of grain moving in U.S. is moving in unit train lots of 25 cars or more.

1996 – Last 40ft boxcar movement of grain in Canada takes place in December 1996.

1996 – First unit train in continuous service of more than 5000 cubic feet using new equipment rated for higher axle loadings begins service on BNSF using Trinity 5161's

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GRAIN SERVICE
COVERED HOPPER CAR BUILT YEARS

Builder	Cubic Capacity	Years Built	Model Mfg.
ACF(Cylindrical)	3500-3960	1961-1966	Atlas
ACF	4600	1964-1981	Accurail
ACF	4650	1963-1983	Atlas/Intermountain
Pullman Standard	4427	1964-1971	Walthers/P2K
Pullman Standard	4475	1966	
Pullman Standard	4650	1965	
Pullman Standard	4740	1966-1972	Athearn
Pullman Standard	4785	1967-1972	Rail Yard Models
Pullman Standard	4750	1972-1981	Intermountain
Thrall	4740	1971-1972	
Evans	4780	1977-1981	
General American	4500/4700	1964-1966	Overland (brass)
Gunderson/FMC	4692/4700	1970-1980	MDC (Athearn)
Magor(aluminum)	4750	1965-1968	
Thrall	5150	1995-1998	
NSC	5150	1994-current	
Trinity	5161	1998-current	Athearn/LBF

Car types shown above were used en mass to replace the standard 40ft boxcar in grain service. The list only shows major U.S. builders of grain service covered hoppers and is not all-inclusive