The Water Level Route Takes to the Water:
NYC Marine Operations in New York Harbor

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Part 1 – Overview

An important division within the New York Central System was the Marine Department at New York. In 1921, for example, it employed 1,500 men and boasted 308 pieces of "floating stock" (as opposed to rolling stock) to handle the enormous traffic to, from, and within the Metropolitan region.

This may seem odd in a way - unlike any other railroad, the New York Central had tracks that ran right into Manhattan, both on the east and west sides. Passengers could go directly into Grand Central Terminal, with no ferry ride needed, and freight cars could roll down Manhattan's west side into freight stations, team tracks, and sidings. So why did the Central have a Marine Department with one of the largest fleets of marine equipment in New York Harbor?

The answer is geography. A major factor in making this port the leading one in the nation, and by 1921 the busiest port in the world, was its archipelago form: a bunch of islands and peninsulas separated by navigable waters, which in turn were protected from the ocean itself by more fingers of land. This was a boon to commercial shipping, and to the barges that could reach every part of what also became the largest manufacturing center in the nation, as measured by value added. At the same time, this geography made it prohibitively expensive for a railroad to reach every part of it with track, so all the railroads reaching the port took to the water. Instead of building huge bridges and putting branch lines through densely built-up neighborhoods, the solution was to transfer much of the freight from rail to water, and float it to its destination. It was done this way until a road system blanketed the region, and trucks took over the local distribution. In the century of railroad dominance (roughly 1850 through the 1950's), every railroad reaching the port could get its foot into every door using a "water belt line." One might think a marine department would be too costly, with tugboats and barges costing much more than locomotives and boxcars. But if one starts adding up the cost of building branch lines all over, and then add in the property taxes on all this valuable land, marine departments start to sound cheap. At the Port of New York, they operated on the least expensive possible right of way!

New York Central Tug *No. 31* pushes a carfloat upriver past the company's piers at Weehawken in March of 1956. A very weary Pacemaker boxcar enjoys the ride in the company of a B&O boxcar on left and a CPR boxcar on right. Photo by Conrad Milster.

One of the landmark events in the history of the New York Central really illuminates the place of marine railroading at the Port of New York: the acquisition of the New York, West Shore and Buffalo Railway in 1885. That line was built by competitors (or downright enemies), copying the New York Central's route north from New York toward the Midwest, but on the west side of the Hudson River. The result was a rate war that the Vanderbilt interests pursued very adroitly, and the West Shore quickly went into bankruptcy. J.P. Morgan famously stepped in to end what he saw as wasteful duplication that was bad for business in general, and essentially handed the West Shore over to the New York Central. That unintended acquisition was soon found to be useful. When freight traffic to the port greatly increased in the late Nineteenth Century, the management of the New York Central chose to divert much of that increase (especially export freight) to the West Shore route terminating in Weehawken, New Jersey, and to turn it over to the Marine Department. To do this it had to enlarge the Weehawken Terminal, but this was far less expensive than trying to expand its New York terminals, and the resulting yard was much better laid out than anything that could have been built in Manhattan. From Weehawken, the freight could be floated quickly to or from any ship in the harbor. Thus the only railroad with direct rail access to Manhattan chose to expand its capacity by utilizing a New Jersey terminal and a "water belt line," instead of extending its tracks on land, and that makes a major statement about how the New York terminal area worked.

Why do we need to explain - and defend - this system? Some Nineteenth Century writers (and later ones as well) claimed that the lack of tracks on piers in much of the Port for loading directly from freight cars to ships showed that it was backwards and inefficient, and the steamship companies would leave for other ports. The figures show the opposite: the number of ship arrivals and departures at the Port of New York kept growing until it was the busiest port in the world by the 1920's. The steamship companies actually preferred the lighterage system at New York, where every railroad could reach every ship on equal terms, and load from "offside" as it was called.

Of course we're talking here about package freight, not about bulk freight. A ship that is loading nothing but bulk oil or coal or grain is most efficiently loaded at a pier that specializes in that traffic, and transferring it directly to or from the appropriate type of freight car. There was considerable bulk traffic in the port, handled mainly on the New Jersey side, and in fact most of that was done with direct transfer. The large unloading cranes on the West Shore Railroad's Weehawken piers were a good example. But the focus at the Port of New York was on package freight. That earned more revenue per ton, was much trickier to load properly, and traveled on scheduled ships called "liners" rather than on bulk ships which usually were "tramp" steamers (the term for ships that did not sail on a fixed route and schedule). Liner traffic was handled very fluidly by the railroad marine departments at this port.

All this changed after the middle of the Twentieth Century. New York's share of traffic (though not the absolute amount) declined with the growing importance of trade with Canada and Asia. The government's construction of highways and bridges allowed trucks to take over the local distribution. And then along came containerization, which essentially converted package freight into bulk freight. The Port of New York was not behind in converting over to containers. The Port Authority saw it coming in the 1960's and built a whole new terminal with container cranes on the New Jersey mainland, right next to major highways and rail lines that could reach west without bridges or barges. That did not help the New York Central, and it certainly spelled doom for railroad marine departments. Rail marine at the port was essentially terminated in 1976 when Conrail took over everything.

We will look at the Central's Marine Department and the way it worked in its prime, and the composition of the company's "railroad navy." Railroad work may be divided into two classes: the actual transportation of goods over distance, or "line haul," and terminal work, where the goods are transferred between a line-haul train and the actual origin or destination. The kinds of terminal work, and facilities for it, vary greatly at different locations and for different types of goods. At the Port of New York, the Marine Department did much of the terminal work.

The simplest terminal operation was perhaps the ferry business: commuters from the west side of the Hudson River took West Shore passenger trains to Weehawken where they transferred to ferries that plied two routes, one to midtown at 42nd Street and one to downtown at Cortlandt Street.

Freight operations were more complex, serving a wide variety of needs. Some of it was interchange carfloating: freight cars were loaded aboard carfloats (barges with tracks on their decks), using a special type of bridge between land and boat. Then the carfloat was towed to another railroad terminal where the cars were taken back onto land. In addition to interchange, carfloats could also serve as floating sidings, where they would be delivered alongside industries with wharves, or alongside piers that functioned as freight stations, or even next to a ship, and freight would be directly unloaded from, and/or loaded into, the cars on the float.

The alternative to carfloating was lighterage. This was the term used at New York for terminal work that involved the transfer of freight between cars and lighters (barges), with the lighter making the final delivery or the initial pickup. Some freight went directly between cars and the harbor craft, while other

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freight was stored temporarily in piersheds or grain elevators, where it could be held until called for, or consolidated into larger loads. A barge can hold several carloads of freight. Different types of barges were used, depending on the type of freight.

Freight consigned to most of the New York terminal district was delivered under terms of free lighterage, with no extra charge for the delivery (or pickup) by harbor craft. This was not really free: what it meant was that the standard terminal fee (added to the line haul fee) covered delivery either by rail to sidings as at most other cities, or by water to a pier or to shipside.

In the beginning, the port's railroads hired outside contractors to do their marine work, since it was an unfamiliar field for them. By the 1870's and 80's, the big marine operator John H. Starin handled this work for most of the railroad companies. But in 1881 the New York Central organized the New York Central Lighterage Company to take over its marine operations. This arrangement continued until 1898, when the railroad formed the Marine Department. In 1899 responsibility for the operation of the West Shore ferries was transferred from the River Division of the West Shore Railroad to the Marine Department. The side-wheel ferries in operation then were all replaced by double-deck screw ferryboats except for one that was held in reserve.

By 1922 the powered equipment of the Marine Department consisted of nine ferryboats, twenty-one tugboats, and seven steam lighters used to carry express and light freight requiring prompt handling. In addition there were about 230 unpowered barges. We will describe the fleets of equipment, and the facilities for handling freight and maintaining the fleet, in a series of articles. The first of these will cover New York Central's "marine locomotives," that is the tugboats that were the prime movers for these craft.

PART 1 REFERENCES

"Marine Dept. of the New York Central Railroad" by Edward Allen, in *Pilot Lore*, published by United New York and New Jersey Sandy Hook Pilots Benevolent Association, 1922, pp. 238-241.

"Railroad Lighterage: The Flexible Belt Line," in *Via Port of New York*, May 1952, pp.1-4.

A full bibliography will be provided at the end of the last part of this series.

Taken from the Palisades that bordered the west side of New York Central's Weehawken terminal, this c. 1920 photo shows a portion of the freight yard as well as piers 4, 5, 6, and 7, the latter a grain elevator that was a waterfront landmark. At a later date, a huge Central oval was painted on its upper flanks. The view looks northeast. NYC Negative 1886-5.

Part 2 – The Tugboat Fleet

The New York Central's fleet of tugboats consisted of a group of "main boats" and two other types, for three different types of service. The main boat was well-suited to assemble and tow carfloats and barges from a rail terminal to piers and terminals around the harbor. It was the most numerous type, and the one that was standardized and built in quantity. The second type was a nimble "drill tug," or "shifting tug," the marine equivalent of a switching locomotive. Third, there were a few more powerful "transfer tugs," generally used by railroads for hauling pairs of loaded carfloats long distances against tides. In addition to tugboats there were a few self-propelled steam lighters.

The New York Central generally numbered its self-propelled craft, but gave names to the unpowered craft, usually the names of towns served by the railroad. A chronological tug roster is presented on page 13. Note that the numbers assigned to tugs do not follow a chronological order. The reason for this is the Central's practice of giving each new tug an old number if one had become available by the retirement of a previous boat bearing that number. Only if an old number was not available was a higher number given. That method must have seemed logical at the time, but it does make things confusing for the historian. Looking at the dates, and where the tugs were built, the railroad's program becomes evident.

Iron Hulls, then Steel

The oldest New York Central tugs running in the 1940's and 1950's were two iron-hulled steamers, *No. 12* and *No. 13*, built in 1887 at Camden, New Jersey by the Dialogue shipyard (full name: John H. Dialogue and Son) at Kaighn's Point. These were 90' long with 2-cylinder compound engines rated at 232 IHP. All later tugs were steel-hulled.

The Marvel Period

Starting just before the beginning of the Twentieth Century, the T.S. Marvel yard at Newburgh, New York turned out sixteen tugs for the Central over a 15-year period. *No. 21* and *No. 22* were built in 1899. Aside from the steel hulls, these two sisters were fairly similar to the 1887 tugs, 90' long with compound engines of the same size, though they were

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At Weehawken, a deckhand readies a gangplank to *No. 7*, one of four 81-foot drill tugs built by Marvel between 1901 and 1903. The date here is July 7, 1950, and the nearly half-century-old tug will serve the New York Central for another eight years. NYC Negative 9158-2.

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rated at 300 IHP instead of 232.

In 1900-1901 the Marvel yard turned out the first of the "standard" boats, the sister tugs *C.M. Depew* and *No. 10*. The former was the third tug to carry the Depew name, but we are dealing only with Twentieth Century tugs here. These were both 105' long, and had compound condensing engines with cylinders of 20"and 40" diameter and a stroke of 26". These tugs, and any following that were built to the same dimensions, were the main boats.

However the next four tugs built by Marvel for the Central were quite different: they were drill tugs. The 1901 sisters *No. 1* and *No. 11*, and the *No. 7* and *No. 23*, built in 1902 (or 1903 according to some sources), were only 81' long and had single cylinder engines. The later pair had slightly more powerful engines.

Then in 1906 Marvel built *No. 2*, a main boat. It also built *No. 8*, another single-cylinder drill tug. At 90' long, this one was longer than the earlier four, and had a larger engine, with a single cylinder having a 20" diameter x 26" stroke, and 300 IHP.

Next came *No. 25* in 1907, and *No. 17* and *No. 26* in 1909, all main boats. In 1912 Marvel built a pair of sisters, *No. 19* and *20*, that would appear to be throwbacks, 90' long compounds that were essentially identical to the two 1899 tugs. Then in 1913 came *No. 18*, the only transfer tug to come from Marvel; at 111 ft. and 1087 IHP it was considerably longer and more powerful than the other Marvel tugs.

In this period, only one tug was acquired directly from a different yard: *No. 27*, another big tug, 110' long, with a 950/1000 HP 2-cylinder compound engine, built by N.Y. Shipbuilding at Camden, New Jersey in 1910. The third transfer tug came later: *No. 15*, also with a 2 cylinder compound, 1000 HP engine, acquired by the Central in the early 1920's. It had been built in 1909 by the Fore River yard at Quincy, Massachusetts for the New Haven Railroad, which always needed powerful tugs due to its long carfloat route through the East River, and had been acquired by the government in WW I. Although these three transfer tugs were similar in length and indicated horsepower, they were from very different sources and of different designs, and so were not sister tugs.

Post-Marvel USRA Tugs

Marvel built good tugs, but the Central ordered no more from them after 1913, as Marvel went out of business due to problems with the U.S. Govern-

New York Central's only named tug, *C. M. Depew*, was actually the third tug carrying the NYC official's name. Chauncey M. Depew was president of the NYC&HR from 1885 to 1898 and was later Chairman of the Board of Directors of the NYCRR. The *C. M. Depew* was the first of the 20th Century "main" boats. Photo from the Steve Lang Collection via Ron Parisi.

ment in WW I. Even so, the Central's next two tugs were very similar to the main boats from Marvel. *No. 3* and *No. 9* were built in 1916 by the Bethlehem Steel Company's Harlan yard (formerly Harlan & Hollingsworth) in Wilmington, Delaware. Their engine dimensions were identical to those of the Marvel main boats, but they are listed as two feet longer. Their engines were built by W&A Fletcher of Hoboken, New Jersey and installed at Fletcher's yard. Fletcher's drawings of these tugs are now in the South Street Seaport Museum Library, and one of them is labeled "New York Harbor Type / United States Railway Administration, Washington D.C." and dated 1918. It would be interesting indeed if a standard tugboat design was adopted by the USRA committee, just as it adopted a number of standard locomotive and freight car designs that began the era of standardization on American railroads. It is possible that the USRA label on this drawing may mean only that Fletcher or the New York Central managed to get the plans approved by the USRA in order to get priority for the work needed to complete them during WW I. Even so, the plans were clearly intended to specify not just one or two tugs, but a generic tug specification, so in that sense this was at least potentially a standard design.

The 1920's

In the post-WW I period, the New York Central added five more steam tugs to its fleet. In 1923 it acquired three sister tugs, *No. 30*, *No. 31*, and *No. 32*, built by the Tebo Yacht Basin shipyard in Brooklyn, NY. These were again two-cylinder compounds, and at 108' were slightly longer than the earlier 105-footers, but considering that the engines had the same dimensions they could really be considered the culmination of the main boat.

Finally, *No. 16* and *No. 24* were built in 1924 by the New Jersey Dock & Transportation Co. of Elizabethport, New Jersey; they were the Central's last steam tugs. These two sisters were similar to the 1906 shifting/drill tug *No. 8*, being 92' long and having the same engine. This type must have proved useful, for these three tugs lasted on the Central right up until the merger, while the smaller drill tugs left the roster in the 30's and 50's.

In 1926 the Central acquired something new: *Nos. 33* and *34* were diesel-electric tugs built in 1926 by Staten Island Shipbuilding (see details below). These two were the last tugs built for the Central. Also in 1926 the 1899 Marvel tugs *No. 21* and *No. 22* were

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In this undated view, a crewman on a carfloat catches a line tossed to him from the bow of tug *No. 18*. A boxcar is on the carfloat at the left. Thomas Flagg Collection.

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converted to diesel, but apparently the Central was not impressed with them, and they were sold off about ten years later.

The Three Types

The single cylinder, non-condensing tugs were clearly intended for work requiring the highest maneuverability, including quick reversing, a characteristic of single-cylinder engines, and small size. This could include bringing barges in and out of crowded slips, either at the waterfront terminals or next to steamships. These shifting tugs were analogous to switching engines. As we have seen, the Central seems to have had two versions of this type. *No. 8*, *No. 16*, and *No. 24* were the longest-lived.

On the other hand, the medium-size tugs, 105'-107', powered by efficient engines with condensers, were the standard float tugs for general work requiring more power but less agility. The 1901 *Depew* was the first of the 105' compounds, and the only tug built for the Central that retained a name rather than being numbered. John Terpenning, who worked for the Central, said that the drill tugs were called "shifting tugs," and the rest were just boats, or "main boats."

As we have seen, there were four smaller (90'), compound-engined tugs apparently intended for the same service, possibly examples of an earlier design. These boats seem not to have been as successful as the main boats. As mentioned above, the 1899 pair, *No. 21* and *No. 22*, were dieselized in 1926, and then sold off within a decade. According to Terpenning, the other two, *No. 19* and *No. 20*, "were stiff and always seemed underpowered" and, at least in the "glory years," were never used to take two floats to Long Island City, or even one float to the United Fruit piers.

Then there was the third type, the transfer tugs *No. 15* (ex-New Haven), *No. 18*, and *No. 27*, the ones that were longer and more powerful than the main boats, and were used for the bigger jobs. While each of the three types had its preferred service, this didn't stop the railroad from using the tugs wherever they were needed. Pictures of the Central's tugs at work show all kinds of tugs being used for all kinds of work.

Conversion to Oil

In the early 1920's, efficient oil-burning apparatus was devised that could be installed in existing boilers. While some tug operators stayed with coal, the New York Central converted all of its tugs in 1922, during a long strike that, according to John Terpenning, had idled its tugs. In fact, New York Central was the first railroad in the New York area to convert all of its tugs to oil.

Marine Steam Engines

A thorough description of marine steam engines is beyond the scope of this article. The mechanisms

Central's Weehawken Marine Shops are seen here from the Hudson, with several Marine Department craft tied up at the waterfront, including six tugs, two covered barges, an open scow, and a large maintenance barge/pile driver. September 1962 photo by Conrad Milster.

are fascinating, but their variety and complexity is such that a thorough historic overview is a daunting project. Some interesting material appeared in the June 1990 issue of the magazine *Live Steam*, such as a description of *No. 16*'s engine.

We will limit ourselves here to distinguishing between the two general kinds of power plants used in the Central tugs. The switching tugs used one-cylinder engines exhausting directly into the atmosphere through an exhaust line that was separate from the boiler stack; they were non-condensing. These were sometimes called "high pressure" engines, because their exhaust steam was at a higher pressure than the atmosphere, though not by much. Such engines could reverse instantly, unlike the multi-cylinder compound engines, where the steam had to clear all cylinders before stopping. They had other virtues too, such as simplicity.

On the lower deck of Tug *No. 32*, the oiler checks the temperature of the steam engine's crankshaft bearings by feeling them as they rotate. This sounds incredibly dangerous, but it was part of the oiler's daily routine. At left is the condenser, and in the foreground is the thrust bearing. The cylinders are out of sight on the deck above. November 1966 photo by Conrad Milster.

The main boats used two-cylinder compound engines. In a compound engine, steam at high pressure is used in the first, smaller cylinder. It exhausts with energy still in it and is then reused in the second, larger cylinder. After that the steam is at such low pressure that it must exhaust into a semi-vacuum instead of to the atmosphere, so it is led into a condenser where it is cooled by contact with water and condenses back into water itself; this in turn creates a partial vacuum. For that reason these were sometimes called "low pressure" boats. This type of engine was not necessarily more powerful than a simple engine, but was more economical of fuel and also water. Of course a tug on shifting duty did not go far from sources of fuel and water, so had less need for efficiency than a tug that went all around the harbor. All the engines of the Central's main boats had high and low pressure cylinders of 20" and 40" diameter, respectively, and a stroke of 26". The indicated horsepower (IHP) of most of them was 500, at a working pressure of 125-135 lbs. The last and most highly developed tugs of this design, *No. 30*, *No. 31*, and *No. 32*, had the same size cylinders, but their working pressure was raised to 165 lbs, resulting in an IHP of 750 instead of 500.

Unlike larger boats (such as railroad ferries), the operating controls used by the engineer on a tugboat were at about the same level as the main deck. As you stepped from that deck through the door you were in the upper engine room, with a floor level about at the base of the steam cylinders. Descending a ladder or companionway, you reached the lower engine room and were now at the level of the base of the engine. Here were the crank-

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shaft, rod ends, boiler (in a separate room), and auxiliary equipment. The latter included feed pumps, condenser (on condensing tugs), generators, steam-powered pumps, and steering gear. Depending on the era of construction, the cylinders were usually supported by spreading legs made of cast iron or cast steel; this arrangement was sometimes called an A-Frame. The engine room crew had intimate contact with their machinery, and an oiler checked the temperature of a bearing of the crankshaft by touching it as it came flying around to him.

Diesel Tugs

In the post WW-II era, all the other major railroads in the harbor and two of the small Brooklyn lines acquired fleets of diesel tugs, in the same way that they dieselized their locomotive fleets. Their remaining steam tugs were retired when lighterage traffic began falling off soon after. But the New York Central did not go this route. It ran its steam tugs right up to the end in 1968. This was in spite of the fact that the Central was one of the earlier roads to try out diesel tugs. In 1926, only two years after the PRR acquired the first successful diesel-electric railroad tug in the harbor, the Central received two diesel tugs with electric drive, *No. 33* and *No. 34*. *No. 33* was powered by McIntosh & Seymour engines; *No. 34* by Ingersoll-Rand engines, but otherwise they were almost identical. They were designed by J.W. Millard & Bros., and built and outfitted by the Staten Island Shipbuilding Corp. Overall length was 108', 3-1/4" (but 96' registered length), 26' beam. Their GE electric motors were about 600-650 HP. These tugs were described in the *New York Central Lines Magazine* for March 1926 when they were on order but had not yet arrived. An interesting statement in the article is the following: "The design will conform in general to that of the steam tugs now owned by the company. They will be 108 ft. long and will have a maximum breadth of 26 ft. They are being designed to handle car floats and large tows." In other words, these tugs were intended to be a diesel-electric version of the main boat. They would be somewhat more powerful, and pilothouse control, that is, direct control of the engines and propeller, not requiring the engineroom man to carry out the orders, would be a big advantage in the kind of work done by railroad tugs. No mention was made in the article of the slightly smaller crew that would be needed. The builder of the engines of one of them (Ingersoll-Rand) produced a nine-page promotional piece claiming it to be the most powerful oil-electric tug in the harbor at the time. This piece was reprinted in *Central Headlight*, Vol. XII, No. 4, and includes drawings and many photos, including interiors.

So how did the Central like these tugs, after they were in use? One indication is in the fact that *No. 33* was apparently requisitioned by the military in WW II and never came back to the railroad; instead, the

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Tug *No. 18* maneuvers the covered barge *Sandusky* in the New York Harbor. This tug was built in 1913 and was longer (111 ft.) and more powerful than the railroad's "main" boats, in fact she was the most powerful tug in New York Harbor in 1915, rated at 1087 HP, with a two-cylinder compound engine. She was built by Marvel at Newburgh, New York. In 1925 she was equipped with a new innovation: a radiotelephone! H. L. Vail/NYCSHS Collection.

NEW YORK CENTRAL 20th CENTURY TUGBOAT ROSTER

Off. #	NAME	DATE	SHIPYARD	LOA	ENGINE	IHP	WP	EX
100415	*No. 12*	1887	Dialogue Shipyd.	90	15,30 x 22 Compound	232	150	1956
155151	*No. 13*	1887	Dialogue Shipyd.	90	15,30 x 22 Compound	232	150	1955
130846	*No. 21*	1899	Marvel	90	15,30 x 22 Compound (Dieselized 1926, M-S?)	300 (300)	150	1937
130847	*No. 22*	1899	Marvel	90	15,30 x 22 Compound (Dieselized 1926, I-R)	300 (300)	150	1937
127508	*C.M.Depew*	1900-01	Marvel	105	20,40 x 26 Compound	500	125	1964
117017	*No. 10*	1900-01	Marvel	105	20,40 x 26 Compound	500	125	1967
130946	*No. 1*	1901	Marvel	81	18 x 22 Simple	225	135	1948
130947	*No. 11*	1901	Marvel	81	18 x 22 Simple	225	135	1948
131000	*No. 7*	1902-03	Marvel	81	18 x 24 Simple	250	135	1958
131001	*No. 23*	1902-03	Marvel	81	18 x 24 Simple	250	135	1958
203525	*No. 2*	1906	Marvel	105	20,40 x 26 Compound	500	135	1957
202673	*No. 8*	1906	Marvel	90	20 x 26 Simple	300	135	1968
204760	*No. 25*	1907	Marvel	105	20,40 x 26 Compound (Dieselized 1952, 278A)	500 (1200)	135	1971
206923	*No. 17*	1909	Marvel	105	20,40 x 26 Compound	500	135	1958
206924	*No. 26*	1909	Marvel	105	20,40 x 26 Compound	500	135	1966
207774	*No. 27*	1910	NY Shipbldg,	110	19,42 x 30 Compound	1000	188	1959
210748	*No. 19*	1912	Marvel	90	15,30 x 22 Compound	300	150	1959
210749	*No. 20*	1912	Marvel	90	15,30 x 22 Compound	300	150	1964
211726	*No. 18*	1913	Marvel	111	20,42 x 28 Compound	1087	160	1968
214507	*No. 3*	1916	H&H	107	20,40 x 26 Compound	500	135	1965
214670	*No. 9*	1916	H&H	107	20,40 x 26 Compound	500	135	1958
206133	*No. 15*	1909 *	Fore River	111	20,44 x 30 Compound	1000	150	1968
222741	*No. 30*	1923	Tebo	108	20,40 x 26 Compound	750	160	1961
222786	*No. 31*	1923	Tebo	108	20,40 x 26 Compound	750	160	1969
222787	*No. 32*	1923	Tebo	108	20,40 x 26 Compound	750	160	1968
224269	*No. 16*	1924	E'Port	92	20 x 26 Simple	400	150	1969
224270	*No. 24*	1924	E'Port	92	20 x 26 Simple	400	150	1972
226100	*No. 33*	1926	S.I. Shipbldg.	108	McIntosh & Seymour diesel	800		1945
226101	*No. 34*	1926	S.I. Shipbldg.	108	Ingersoll-Rand diesel	800		1969

* *No. 15* was acquired by N. Y. Central in early 1920's; it had been built in 1909 for the New Haven Railroad.

This roster of the tugboat fleet is arranged in chronological order, in order to show the sequence of the railroad's tugboat acquisitions. It includes only tugs built in the Twentieth Century, and/or present in the post-WW II period. In some cases these were the second or third tugs to have these numbers; each one listed here was the last tug to bear the number. The last column, labeled "EX," gives the year in which each vessel left the railroad's fleet list, whether by being scrapped, sold off, or any other fate.

Information for this roster comes mainly from *Johnson's Marine Manual, A Directory of American-Owned Commercial Craft*, the *ABS Record*, and *"MVUS"*, the standard abbreviation for *Merchant Vessels of the United States*, published annually by the U.S. Dept. of Commerce in compliance with an 1884 directive by the U.S. Congress.

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towing firm Moran acquired it in 1945.

On the other hand, *No. 34* was kept right to the end. According to Harold Crouch (*Live Steam*, May 1991), who worked for the Central, her original Ingersoll-Rand engines did not last long, and the tug was refitted with two McIntosh-Seymour Model 538 engines. These lasted for many years, but eventually too costly to repair, they were replaced by two Baldwin VO engines from two retired switching locomotives in 1966 or 1967. Alan Frazer wrote a commentary on the reprint of the 1927 Ingersoll-Rand promotional brochure about *No. 34*, mentioning that some notes by Millard on the diesel tugs' performance suggest that they did not bring a great deal of cost savings with them.

Also in 1926, two more diesel experiments were carried out. Steam tugs *No. 21* and *No. 22* were dieselized. These were two of the four smaller compound engine boats. Like the new tugs, one was given an Ingersoll-Rand engine, according to the 1927 brochure. The other probably received a different make, possibly a McIntosh-Seymour engine. Unlike the new boats, these conversions were both direct-drive, not diesel-electric. Experience with early direct-drive diesel tugs was unsatisfactory, and the same problems with power and responsiveness may have occurred with these, to judge from their short lives on the Central's roster. They vanished from vessel directories after 1935.

The Central was not quite finished with the diesel, however. In 1952 it acquired a postwar diesel-electric tug of a standard design, though not in the usual way that other railroads did. Instead of ordering a new boat, it had one of its main boats (*No. 25*, originally built 1907) converted. The conversion was done by Jacobsen Shipyard, where "TAMS design" boats had been built, using a standard Cleveland 278A 12-cylinder engine, and the result was probably little different in performance from this type of tug acquired by other roads. The Central's employee magazine *Headlight* for July-August 1952, reported, "Success of the change-over on Tug *No. 25* is expected to lead to dieselization of other NYC marine equipment." Even its new paint scheme, gray with a lightning stripe, was apparently to be given to the rest of the fleet, or at least to the newly dieselized boats to come. But no other tugs were converted, nor painted in the gray scheme. Even *No. 25* was soon changed back to the standard olive livery. John Terpenning pointed out that the stripe should have been painted on the upper part of the pilothouse, and should have come around the front as it did on the locomotives. Since it was actually placed around the lower level of the pilothouse, it was blocked from view by whatever boat the tug was towing alongside.

A few years later, *No. 25*'s engine was replaced with a later diesel. But she stayed in the fleet, and according to Terpenning she was the NYC's last working boat after the merger.

Probably the benefits of dieselizing tugboats were not as great as those resulting from dieselizing a locomotive fleet, at least not enough to warrant the considerable investment required for such a large fleet. Marine steam engines are less maintenance-intensive than steam locomotives, and availability was on a par with diesel. Conrad Milster even found in his many explorations inside tugboat engine rooms that boats with steam engines were typically cleaner than those with diesels.

PART 2 REFERENCES

"Railroad Tugs - Part 1A - New York Central Roster and Photos of Nos. 30, 31, and 32" in *Transfer* (the publication of the Rail Marine Information Group) No. 24, pp. 15-20 has the roster in numerical order.

"Tugboats of the New York Central: The Main Boats and the Rest" by Thomas Flagg, in *Transfer*, No. 35, for April-August 2002, pp. 3-12. This article was the basis for the present work, with chronological roster, and cross-section drawing of No. 3.

Transfer No. 23, pp. 5-13: reprint of a March 1941 *Railroad Magazine* article on modeling a 1923 tug, including Ron Parisi's description of the exact colors of New York Central's tugs in the olive green era.

Clark, G.S., 1926: "Harbor Fleet Cuts Fuel Costs by Burning Oil" in *Marine Review*, June 1926, pp. 21-22.

"Two N.Y.C. Diesel-Electric Tugs Ordered" in *NY Central Lines Magazine*, March 1926, p. 22.

Ingersoll-Rand brochure on diesel tugs, 1927 (reprinted in *Central Headlight*, 1981-4, p. 15).

A full bibliography will be provided at the end of the last part of this series.

Tug *No. 34*, one of the two 1926 diesel tugs, is moving the New York Central *Oil Barge No. 2* in July 1934. The New York Central was an early convert to oil for generating steam for its tugboat engines, so it owned several of these very low profile oil barges. They came in handy when diesel tugs were acquired. NYCSHS collection.