

Union Pacific GTEL 3. Big Blow Series



X-18 Illinois Ry Museum, Photo Heinz Däppen

The Prototype

Union Pacific had always sought to have the largest and technically best locomotives. In the 1930s, the first attempts were made with two steam locomotives, which were unsatisfactory. Even before the Second World War the Union Pacific had diesel locomotives that were used mainly to pull passenger trains. In order to achieve the traction force of a large steam locomotive, four of these diesel locomotives would have been required. Union Pacific noted that the maintenance costs of a locomotive were not linked to its driving power and therefore a few powerful locomotives would be cheaper to maintain than a larger number of weaker locomotives. The UP therefore sought for a drive concept with greater performance. General Electric had experience in the construction of gas turbines for aircraft and suggested using a gas turbine to drive a powerful locomotive. Union Pacific concluded that turbine locomotives would be best used pulling long freight trains. When travelling at a constant speed over long distances without intermediate stops the turbine could be operated in an economical RPM range.

After expressions of interest on the part of Union Pacific, Alco-GE built a prototype, the GE 101, which was delivered in 1948. This locomotive was later repainted as UP50 and painted in the Union Pacific colors, although it never was owned by Union Pacific. Unlike most North American locomotive types with a combustion engine, this locomotive had a cabs had at both ends. The cabs were similar to others in the Alco-GE ALCO FA locomotive family. On the side of the locomotive were numerous ventilation grilles which could be opened and closed in different configurations. The axle formula was (Bo-Bo). The turbine generated an output of 4,800 hp (3.6 MW), of which 4,500 horsepower (3.4 MW) were available as drive power. This was more than double the performance of former diesel-electric locomotives. In addition, a small diesel engine was installed, which was used for switching the locomotive and to start the turbine. The turbine was started with diesel fuel, then was automatically switched to Bunker C oil. The locomotive was about 78ft (24m) long weighed 230 tons.

After extensive testing of the prototype three series of turbine locomotives were built. Union Pacific had the intention to replace the Big Boy steam locomotives, which were reaching the end of their serviceability.

Originally, the use of gas turbine engines on the route between Los Angeles and Salt Lake City was planned. Because of the loud noise their operation was not approved in the city of Los Angeles.

1. Series

The first series consisting of locomotive 51 to 60 was delivered as from 1952. These locos were identical to the prototype up to the lack of a second cab.

2. Series

The second production run with the locomotive 61 to 75 was delivered as from 1954. These locomotives differed externally from those of the first production run. Covered, open-sided maintenance walkways on both sides earned them the nickname "Verandas". The ventilation grilles could no longer be closed.

3. Series

The third series of the units 1 to 30 was delivered from 1958 to 1961. This differed greatly from the previous two model series: A larger turbine with an output of 8,500 hp (6.3 MW) was installed, and in each unit was a double locomotive consisting of two permanently coupled units. The axle configuration of each unit was Co'Co '+ Co'Co'. One unit contained the driver's cab, the auxiliary diesel and other aggregates, while the other vehicle contained the turbine and generator. Both parts of a unit had the same number; to distinguish the cab-less unit a "B" added to its number. (in North America cab-less booster locomotives were also known as a B-units).

At sea level, the turbine could produce a maximum output of 10,000 horsepower (7.5 MW), the generator was, however, designed only to 8,500 horsepower (6.3 MW). To date, this turbine is one of the most powerful engines that have ever installed in a single rail vehicle.

The third batch, was nicknamed "Big Blow" due to their loud noise, replaced in time the units 51 to 75 over time. As with the older model series problems with clogged fuel filters had occurred, these were removed and instead the fuel was filtered before refueling.

The turbine locomotives sometimes transported more than 10% of the freight at Union Pacific. The fuel consumption was high, about twice as large as that of an equal powerful diesel locomotive. To reduce the fuel costs, the turbines were therefore operated with cheap Bunker C oil. However Bunker C is very viscous when cold. The fuel tender had therefore to be equipped with a heater, the oil heated up to about 90 ° C. Over time soot deposits and corrosion of the turbine blades by aggressive residues occurred on all turbines.

Source Wikipedia

Sound Project Information

Special thanks go to the Illinois Ry Museum. Their helpful information made the creation of a sound project possible. The Cooper & Bessemer diesel engine and the 5 A-frame GE turbines were partially recorded in similar applications. The sound project are as close as possible to the original locomotive, as there are no more operational locos of this type.

CVs 3, 4, 5 and 57, 154 and 158 are very important values for the sound project. Changing of these can make the sound project unusable. Changing CV5 will adversely affect the moment the turbine becomes audible. Change the top speed using CV 57!

By default the function number is the same as function key. All the functions can easily be assigned to other keys, using the Zimo function key mapping.

Program the desired key number as your value in the CV 400+Fu number and the whole function is mapped to another key. Please take care, as it is possible to map multiple functions to the same key! Please read the instruction sheet <http://sound-design.white-stone.ch/Information.html>

2 Smoke Generators

The model can be equipped with two blowing smoke generators.

Smoke generator 1 starts the diesel sound and smoke generator 2 starts with the turbine noise.

Operation with two smoke generators directly connected to the decoder is possible only with the decoders MX 696 and MX 699. Using FA 6 and 7 for the heaters has to be strictly adhered to for the heaters to avoid damaging the decoder!

Function	Installation	Function output	Sound effect
F0	Light on	FA 0v+0r	
F1	Bell		Bell
F2	Horn l-l-s-l		Highway crossing warning
F3	Horn l		Horn sounds as long as the key is pressed
F4	Horn s		Short blast on the horn
F5	Cab light	FA 5	
F6	Smoke generator	FA 6 u 7 + fan u FA 8	Diesel smoke effects and turbine blow
F7			
F8	Sound on / off		Sound of starter and idling
F9	Wheels screeching on curves		Sound of Wheels screeching on curves
F10			
F11			
F12	Uncoupling	Servo 1 + 2	Serve coupling opens
F13	Coupling		Coupling sound
F14			
F15	Continuous turbine operation		Turbine is on all the time
F16	Tunnel fader (muting)		Sound fades in or out in 2.5 sec
F17			
F18			
F27	Volume control		Quieter
F28	Volume control		louder

Random effect	sound	
Z1		
Z2		
Z3		
Z4		
Z5		
Z6		
Z7		
Z8		

Input	Sound	Effect
1	Horn	
2	Bell	
3		

Changing CVs values used by the reset

CV# 3 = 18	CV# 276 = 220
CV# 4 = 25	CV# 282 = 10
CV# 5 = 252	CV# 283 = 220
CV# 7 = ---	CV# 285 = 60
CV# 17 = ---	CV# 286 = 220
CV# 18 = ---	CV# 287 = 50
CV# 29 = ---	CV# 290 = 20
CV# 35 = 0	CV# 291 = 60
CV# 36 = 12	CV# 293 = 150
CV# 37 = 0	CV# 294 = 200
CV# 38 = 0	CV# 295 = 160
CV# 40 = 48	CV# 296 = 40
CV# 41 = 0	CV# 297 = 60
CV# 42 = 0	CV# 298 = 5
CV# 43 = 0	CV# 299 = 80
CV# 44 = 0	CV# 312 = 7
CV# 45 = 0	CV# 313 = 116
CV# 46 = 4	CV# 314 = 25
CV# 57 = 100	CV# 351 = 204
CV# 58 = 180	CV# 353 = 32
CV# 60 = 60	CV# 355 = 102
CV# 62 = 1	CV# 374 = 15
CV# 63 = 33	CV# 375 = 4
CV# 64 = 7	CV# 376 = 190
CV# 114 = 127	CV# 395 = 120
CV# 115 = 66	CV# 396 = 27
CV# 116 = 145	CV# 397 = 28
CV# 117 = 53	
CV# 119 = 143	
CV# 127 = 36	
CV# 128 = 32	
CV# 129 = 2	
CV# 130 = 1	
CV# 132 = 80	
CV# 133 = 20	
CV# 134 = 10	
CV# 136 = 24	
CV# 137 = 153	
CV# 138 = 204	
CV# 139 = 255	
CV# 152 = 16	
CV# 154 = 18	
CV# 158 = 0	
CV# 159 = 80	
CV# 163 = 255	
CV# 167 = 255	
CV# 181 = 12	
CV# 266 = 100	
CV# 275 = 220	