



PARTS PRO SALESMAN



CLASSIC EDITION #10



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Professional Parts Salesman

1 2 3 4 5
6 7 8 9 10

The Legend
of the 855



FOREWORD

For more than twenty years, the 855 has been the mainstay of our heavy-duty engine line. However, during that time the engine itself has undergone numerous changes, continually incorporating new technology in a constant effort to achieve ever greater horsepower and fuel efficiency.

This program is designed to present an overview of that evolution and to help you as a Professional Cummins Partsperson to gain a better understanding of the 855 engine and the differences and similarities between the various models.

By studying this program and drawing upon your own experience with the NT 855, you will be better able to help your customers to keep their engines running strong for many years to come.

1. *[Faint, illegible text]*



2. **NARRATOR:** Come gather round, and I'll tell you a tale true.



3. A story of power, might and strength... and people who take pride in what they do.

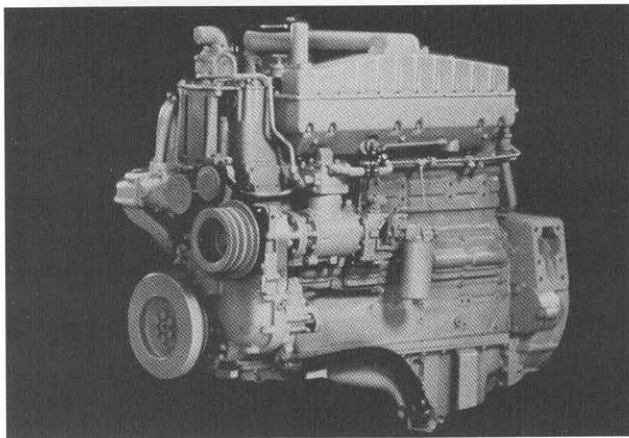


4. It's sung up and down the highway... known to truckers far and wide.





5. It's the story of an engine... The Legend of the 855.



6. Yes, through the years the 855 has earned quite a reputation, and rightfully so. Talk about a mover! This brawny engine really humms.



7. Why, I'll bet that there's not another engine that's seen as many miles.

You find it in more rigs than any other engine on the road today. And, it does its share of work off the road too.

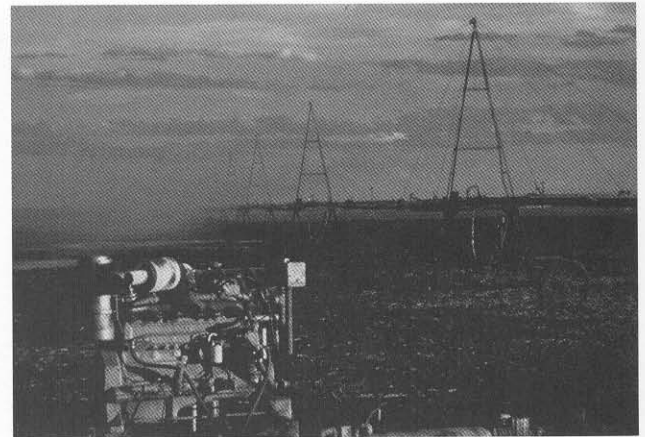


8. From skyscrapers to pipe lines, the 855 is there powering heavy-duty construction equipment:

9. On the farm, the 855 is not only used in large tractors,



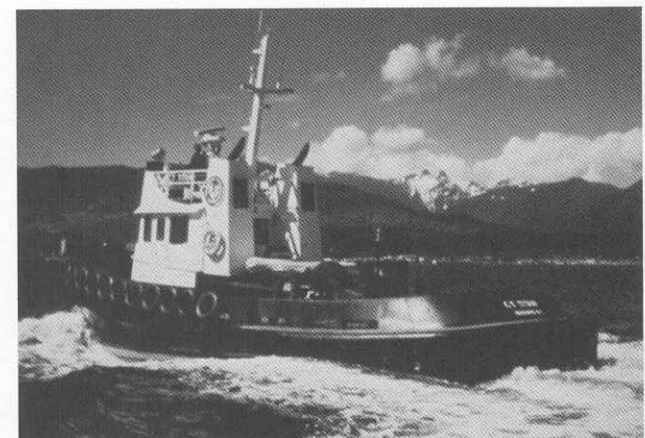
10. But it runs the irrigation pumps as well.

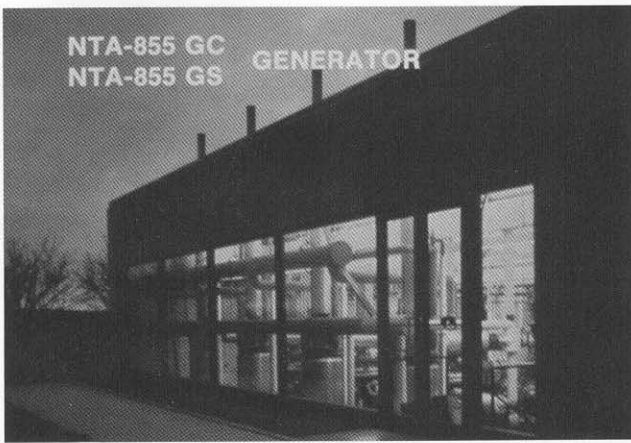


11. Buses, fire trucks...

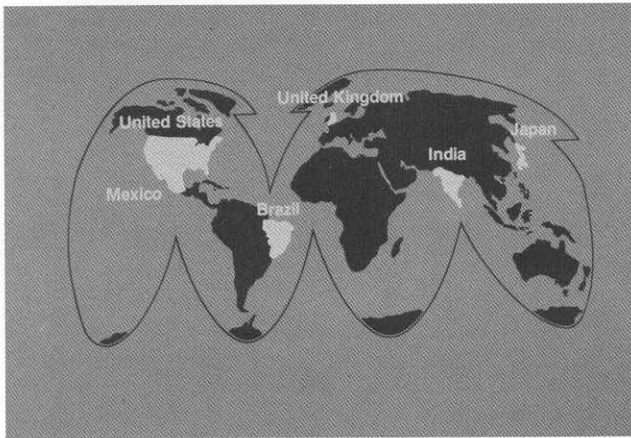


12. Fishing boats and oil rigs too... all get their drive from the 855.

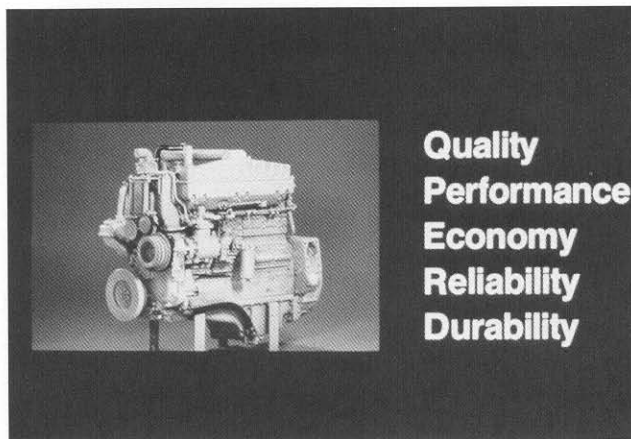




13. And, if electricity is what you need ... why the 855 can do that too.

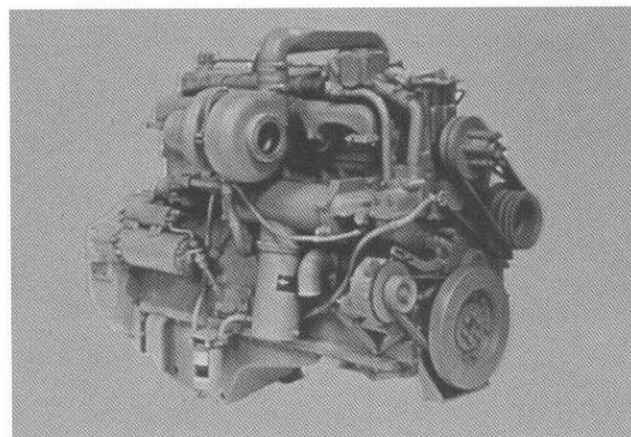


14. Manufactured at plants in the United States, Great Britain, Japan, India, Mexico, and Brazil...the 855 serves the power needs of people throughout the world.



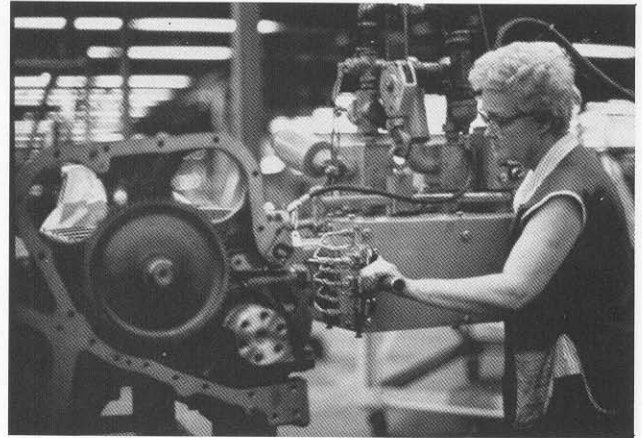
15. A titan among engines, the 855 consistently out distances the competition.

Outstanding quality, performance, economy, reliability and durability are the reasons for its success.



16. Powered by six in-line cylinders with a reliable four stroke cycle, the NT-855 is capable of delivering up to 475 horsepower. But, a powerhouse like the 855 doesn't just happen over night.

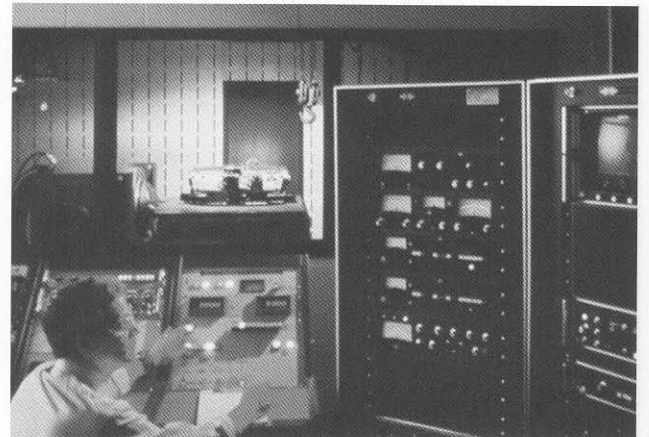
17. It takes people ...
... dedicated, hard working, conscientious people ...
people like you and me.



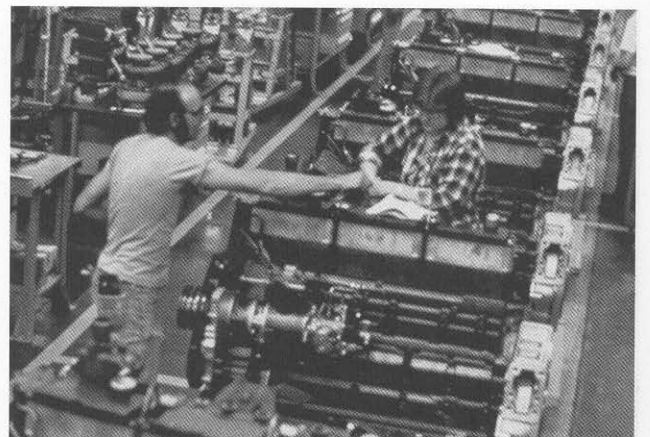
18. People who take pride in their work.
... and who take the time and effort to do it right.

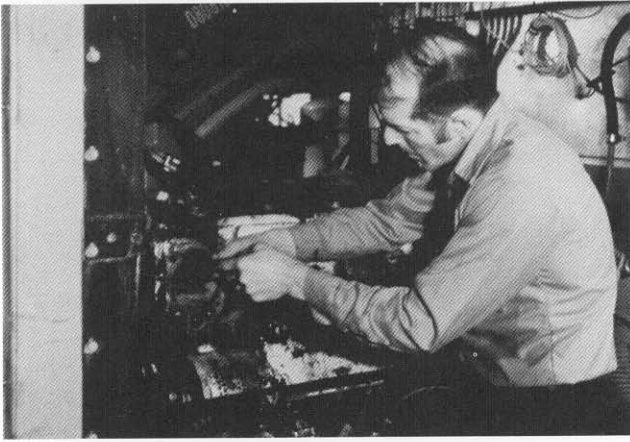


19. From the scientists and engineers ...



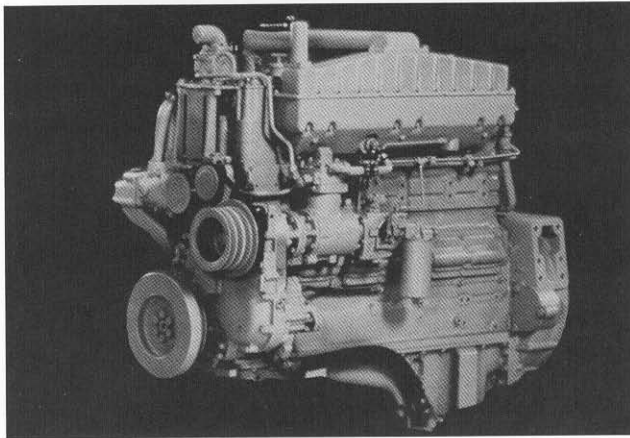
20. ... to the machinist and assembly line workers ...





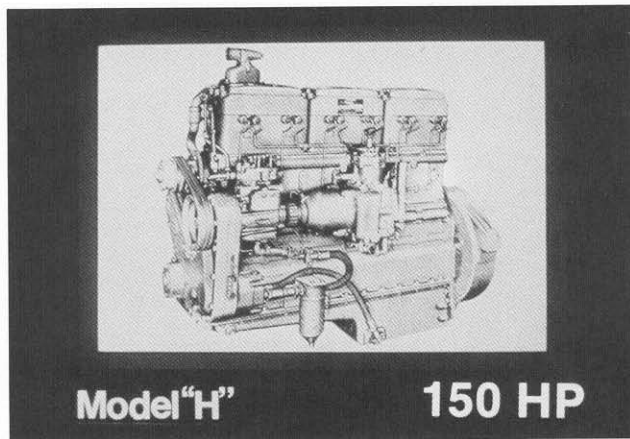
21. ...to the service mechanics and partsmen.

People, whose individual and combined efforts have made this engine what it is today.

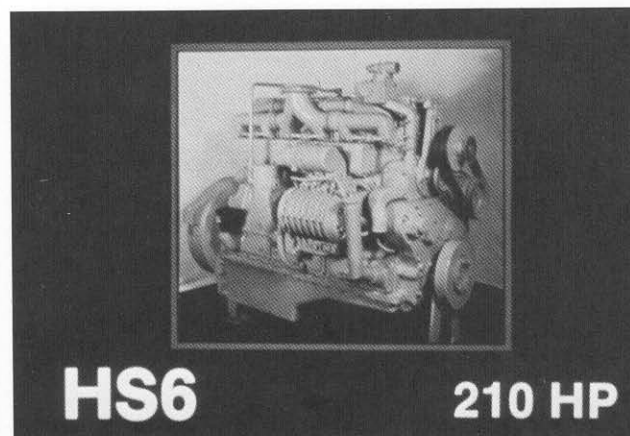


22. It's no wonder that the 855 is built right... it's built with pride!

The story of the 855 is one of change, of growth and evolution.

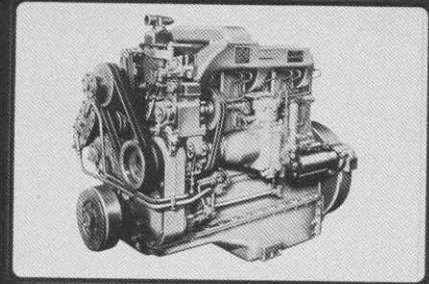


23. Heir to Cummins rich heritage, the 855 descended from the 672 cubic inch H6 which, back in 1932, proved to be quite a revolutionary engine.



24. In 1937, a supercharger was added increasing the horsepower.

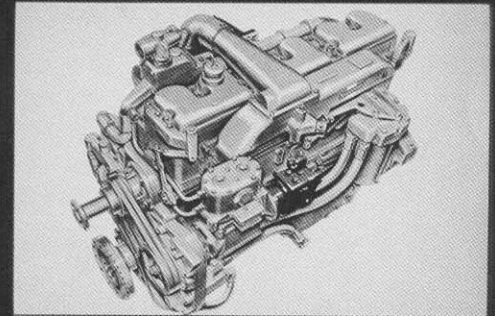
25. In 1944, Cummins introduced the NH-220 and the supercharged NHS. Both engines featured a vibration damper to protect the crankshaft, four valves per cylinder, for improved breathing and an increased displacement of 743 cubic inches.



NH220

220 HP

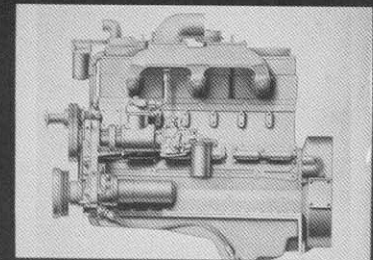
26. In 1954, the engine's performance was again improved by the addition of a turbocharger, plus an innovative new PT fuel system.



NTO 262

262 HP

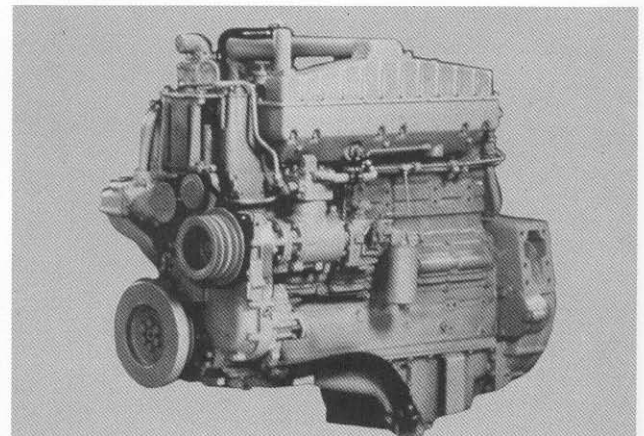
27. ...and, in '57, the engine's displacement was further increased to the current 855 cubic inches with a 5½ inch bore, and the NH-250 was the first engine to feature internal fuel and oil lines. But, the evolution of the 855 didn't stop there. No, sir!

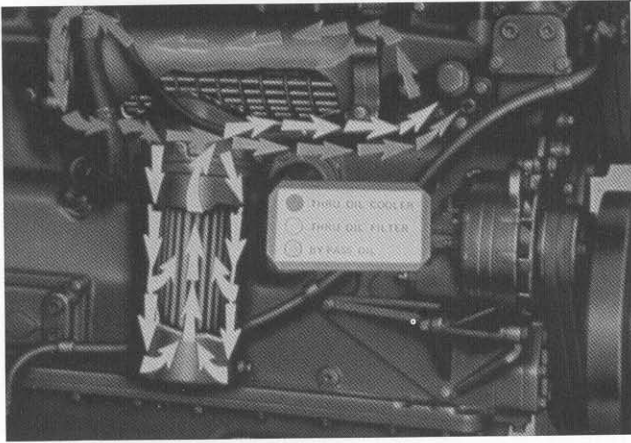


NH 250

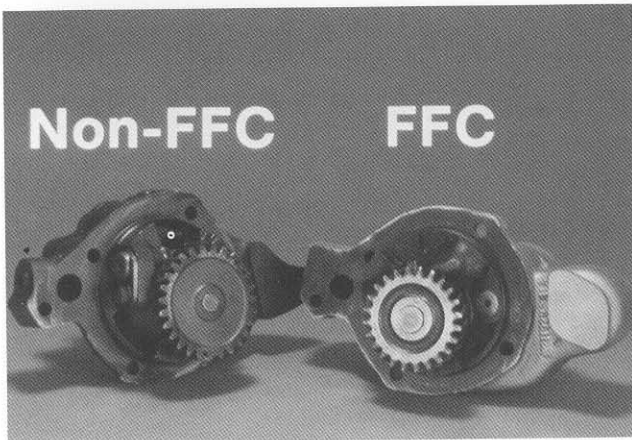
250 HP

28. 1972 saw the introduction of the NT-FFC engine.

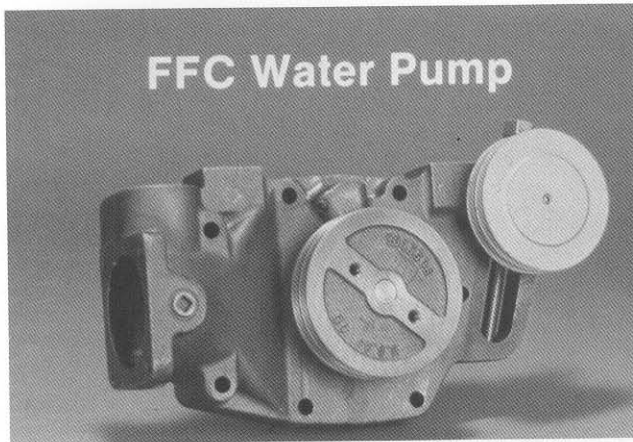




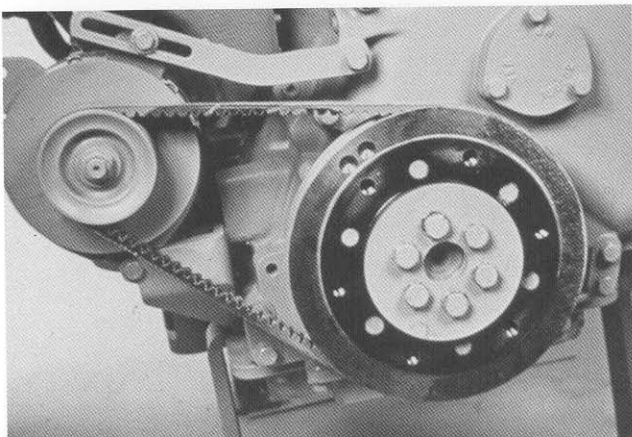
29. Now, FFC stands for full flow cooling, which simply means that all of the lube oil flows through both the oil cooler and the filter before it is circulated through the engine. But, the FFC meant more than just cooler oil.



30. A high pressure bypass was incorporated in the lube pump, and the piston spray nozzles were improved.

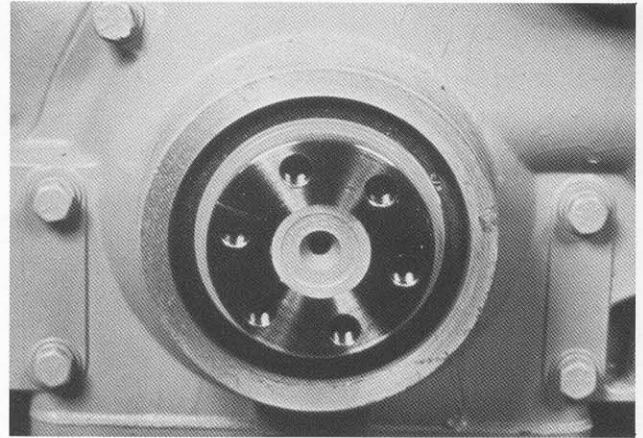


31. Increased coolant flow was provided by a new block mounted water pump with an integral idler pulley for positive adjustment of the two drive belts.

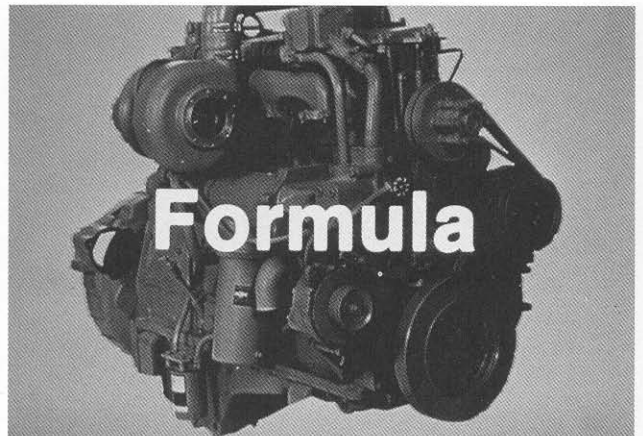


32. And, the alternator was moved from the accessory drive to the crankshaft pulley, resulting in greater water pump efficiency and longer seal life.

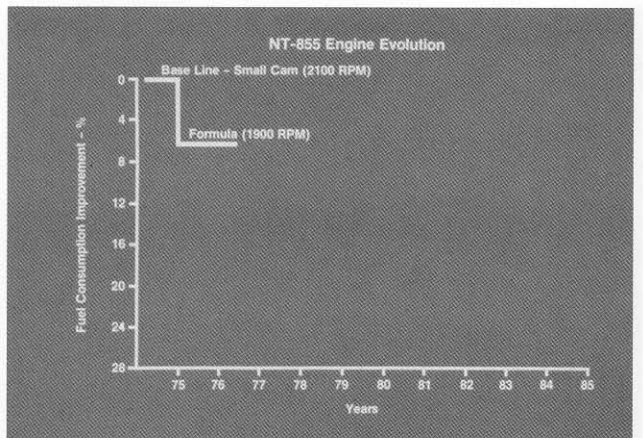
33. Other improvements in the NT-FFC engine included a straight nose crankshaft which was much stronger than the previous taper-nose crank.



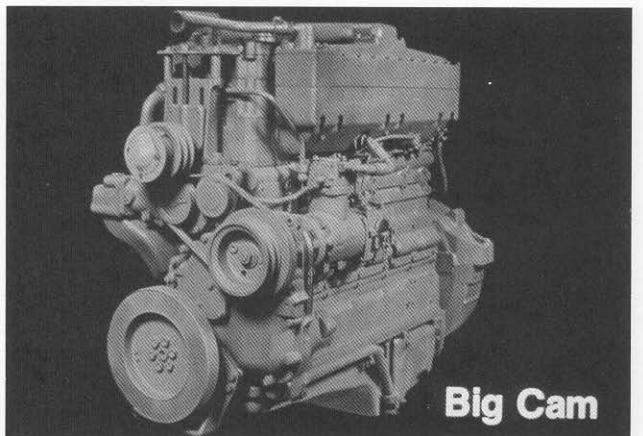
34. In 1975, Cummins introduced the formula concept, reducing the rated engine speed from 2100 RPM to 1900 RPM while maintaining the same rated power output.



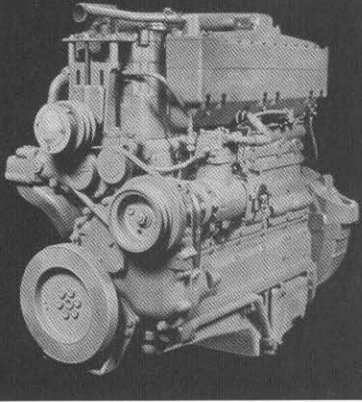
35. By closely matching the turbocharger with the PT fuel pump, the formula engine achieved a 6% overall improvement in fuel economy.



36. Eventually, the overwhelming success of the formula concept spurred yet another improvement...the Big Cam engine.



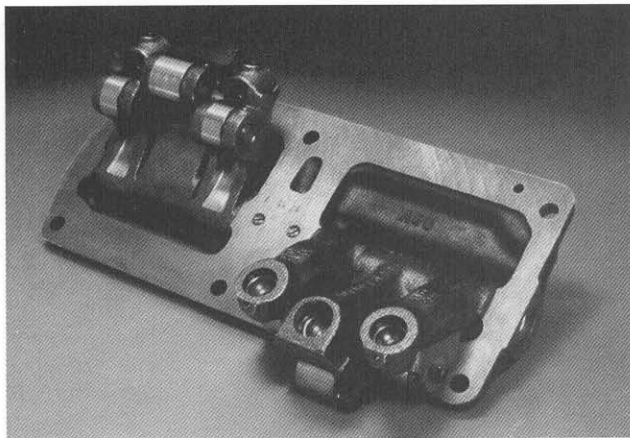
**1600 RPM
1900 RPM
2100 RPM**



37. Although Big Cam engines can operate at 1600, 1900 or 2100 RPMs, they were designed primarily to accommodate the formula concept of reduced operating speed.



38. The Big Cam engine gets its name from its larger 2½" camshaft which has a 25% greater diameter than the previous 2" camshaft. This new camshaft design reduces exhaust emissions and improves fuel economy by providing higher injection pressures without overstressing the camshaft.



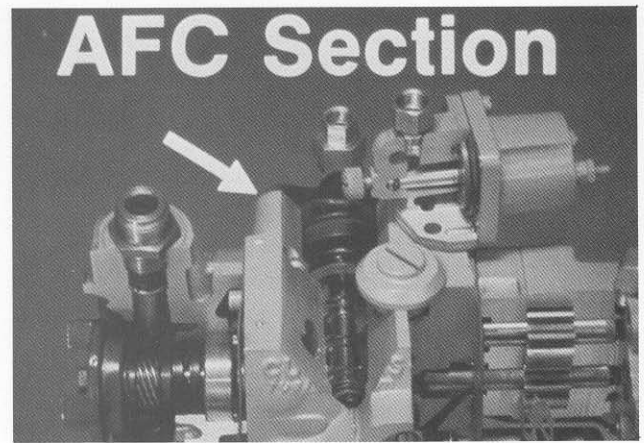
39. But, in order to retain the same camshaft centerline, the cam follower housings had to be moved outward which required that the entire cam follower assembly be redesigned.



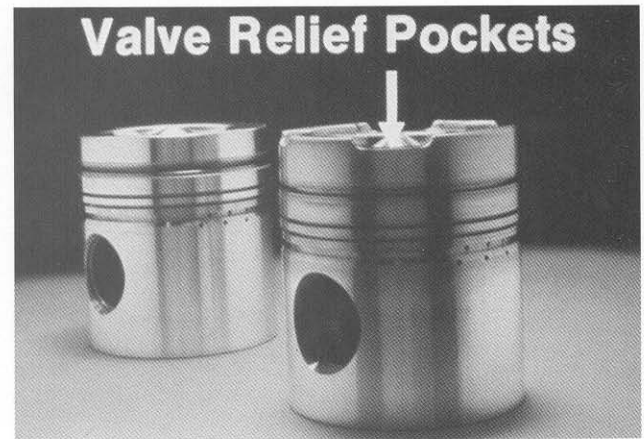
**Top-stop
Injector**

40. All Big Cam engines use the top-stop injectors, which not only maintain their adjustment longer, but also increase the life of the injector train and cam lobes. This is accomplished by limiting the plunger's upward travel, causing a momentary unloading of the injector train during each fuel metering cycle and permitting better lubrication of the injector train components.

41. A special AFC, air-fuel control valve, was added to the PT fuel pump to regulate the fuel according to the air pressure in the intake manifold. The development of the AFC valve improved acceleration and decreased smoke.



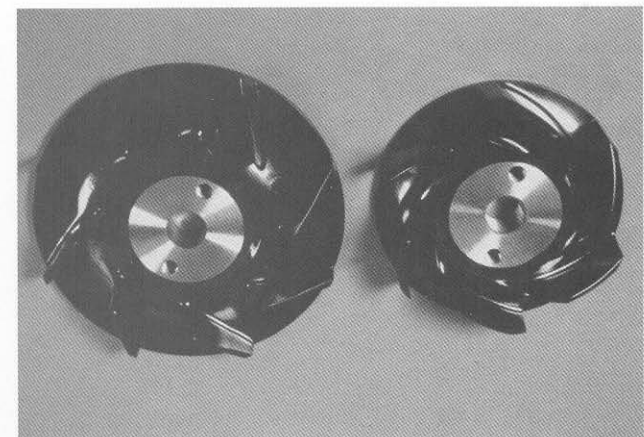
42. In engines rated at or below 350 horsepower, the dome of the Big Cam piston was redesigned to incorporate a higher RIM with valve pockets. The valve pockets provided the clearance necessary for the valves, while the higher RIM maintained the proper compression ratio and improved air and fuel mixing for greater fuel efficiency.

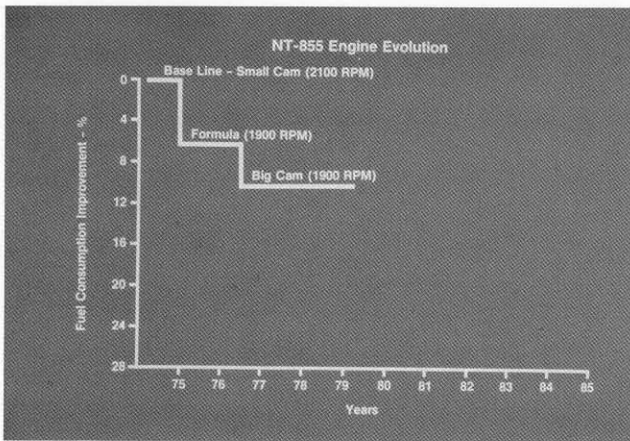


43. The connecting rods in the Big Cam engine were redesigned to make them stronger and to provide the necessary clearance for the larger camshaft. Because of their smaller size, full sets of Big Cam connecting rods may be installed in Small Cam engines; however, Small Cam connecting rods should **not** be used in Big Cam engines.



44. The Big Cam engine also featured a voluted water pump cavity and a small lightweight impeller to produce the same coolant flow while reducing the power needed to drive the pump. A single poly vee belt drive was used for longer belt life.

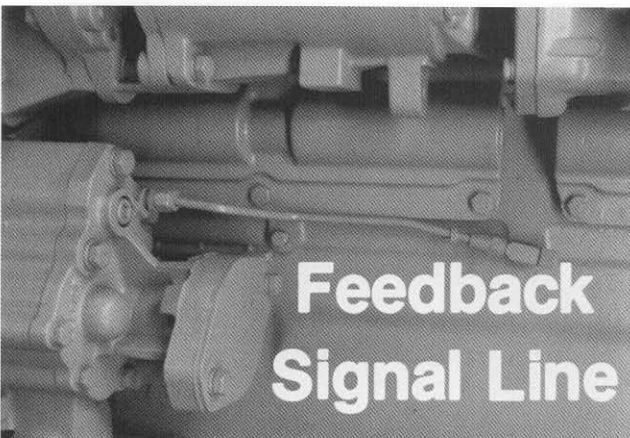




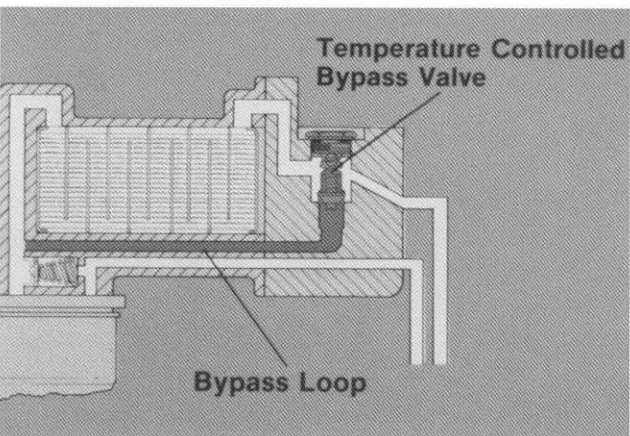
45. Together, the Big Cam improvements resulted in a 4% reduction in fuel consumption over the formula concept Small Cam engine. However, Cummins was not content with the achievements of the Big Cam, and went on to develop the Big Cam II.



46. Like its predecessor, the Big Cam II is a formula concept engine, but with a further speed reduction to 1600 RPMS. It features significant improvements in performance and a 5% increase in fuel economy over the Big Cam I.

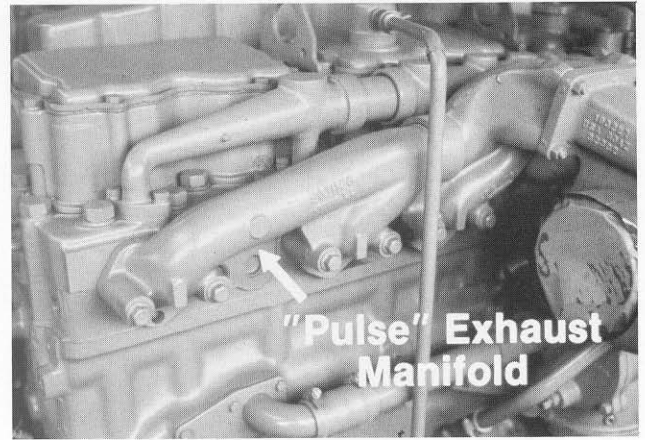


47. Rather than constantly operating at maximum pressure, the Big Cam II's new DFC lubricating system uses a smaller capacity pump with a feedback signal line to maintain the proper oil pressure, so less horsepower is needed to drive the pump and fuel consumption is reduced.

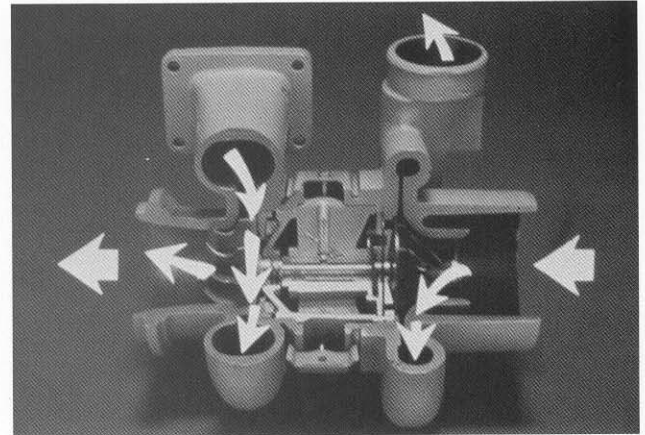


48. The Big Cam II oil filter head also incorporates a temperature sensing valve which bypasses oil around the cooler until the engine reaches the proper operating temperature.

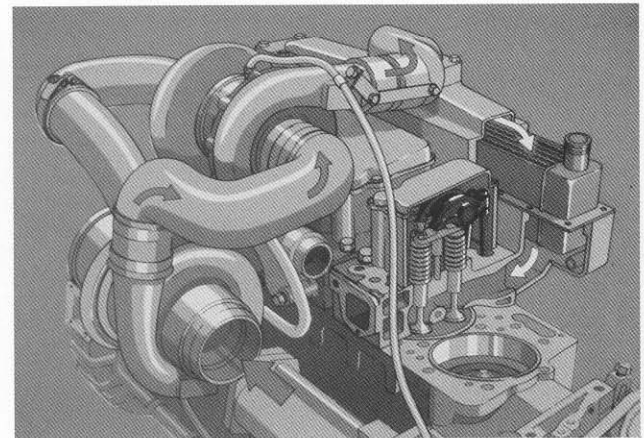
49. The Big Cam II has a "pulse" exhaust manifold with smaller diameter circular passages and smoother bends for the faster, less restricted flow of exhaust gases to the turbocharger and better utilization of the available exhaust gas energy.



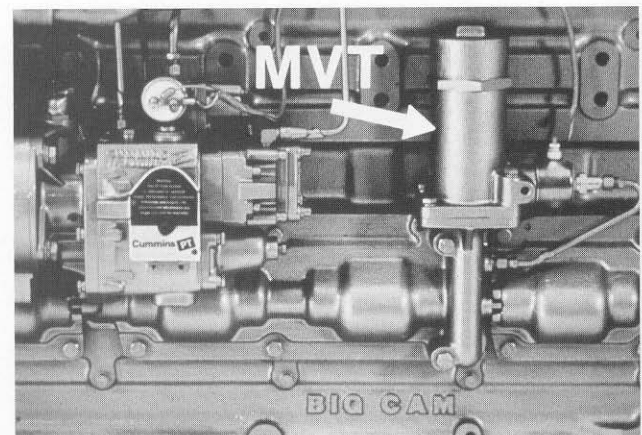
50. The Big Cam II also features a new improved T-46 turbocharger with a smaller compressor wheel and streamlined air flow for greater efficiency, faster turbo response, and improved fuel consumption.

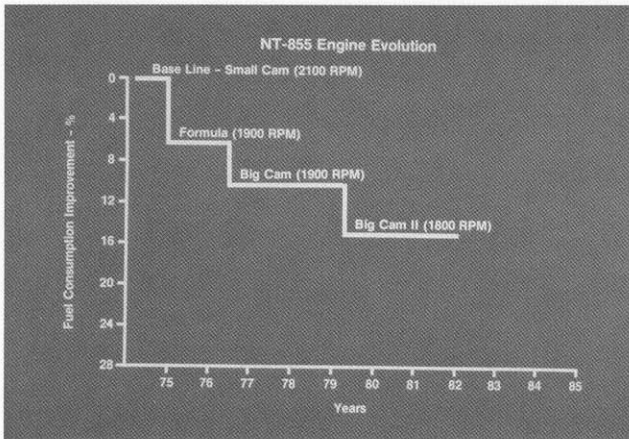


51. The NTC-475 is the first diesel truck engine to feature compound turbocharging. Two turbochargers are used in series to provide the additional air necessary to support combustion of the extra fuel needed to achieve the engine's full horsepower.

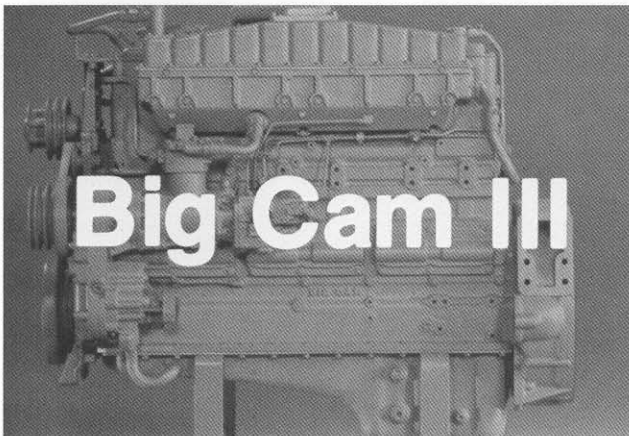


52. California Big Cam II engines were the first to incorporate a MVT (mechanical variable timing) system for alternately retarding or advancing the fuel injection timing according to the engine load for reduced exhaust emissions.

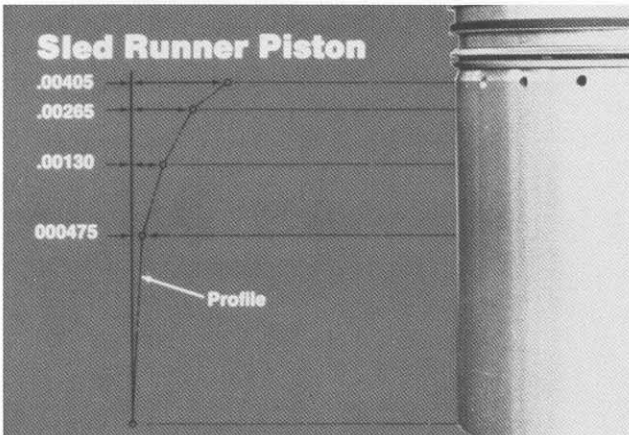




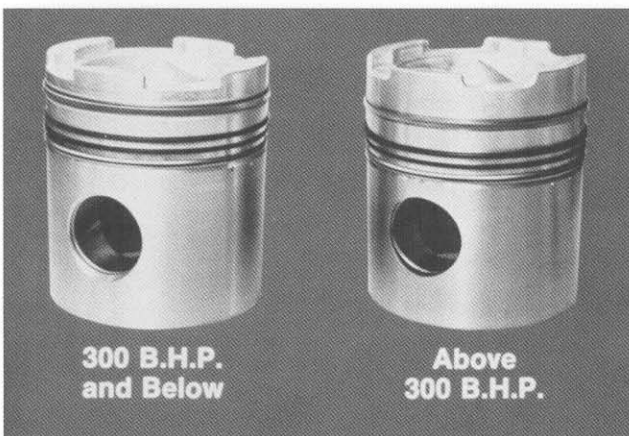
53. Although the Big Cam II did represent a significant improvement over previous engines, the continuing rise of fuel costs led to still further design improvements which, in 1982, were embodied in a new 855 engine...



54. The Big Cam III with improved breathing and a reduced parasitic load for an additional 4% improvement in fuel economy over the Big Cam II.

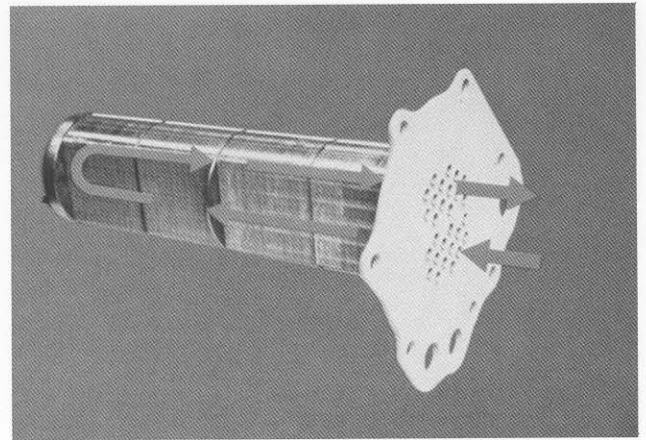


55. The skirt of the Big Cam III piston has a "sled runner" design which reduces piston rocking and engine noise by decreasing the clearance between the skirt and the liner.

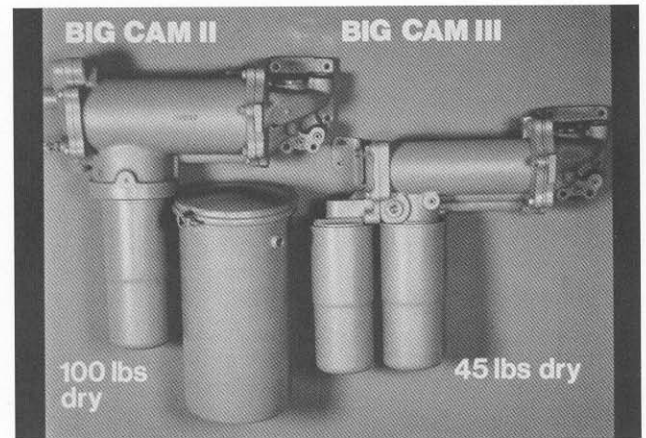


56. And, on engines rated at 300 hp. or below, the piston ring pack has been moved up to improve combustion efficiency by reducing the area where fuel can be trapped between the crown of the piston and the liner.

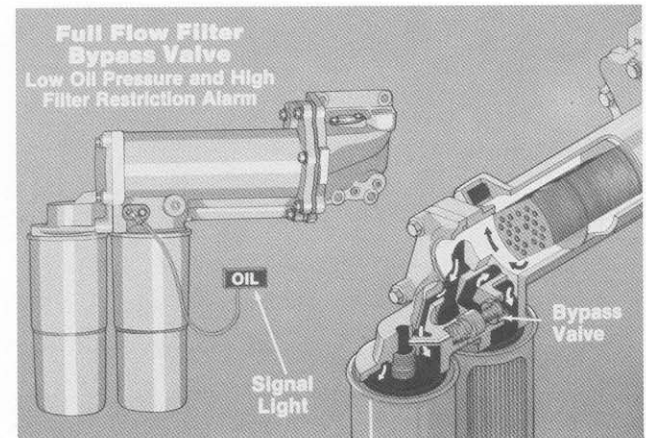
57. The two-pass cooler core is a "higher effectiveness core." Its high effectiveness rating is accomplished by using a greater number of cooling fins, and the coolant will make two passes through the core.



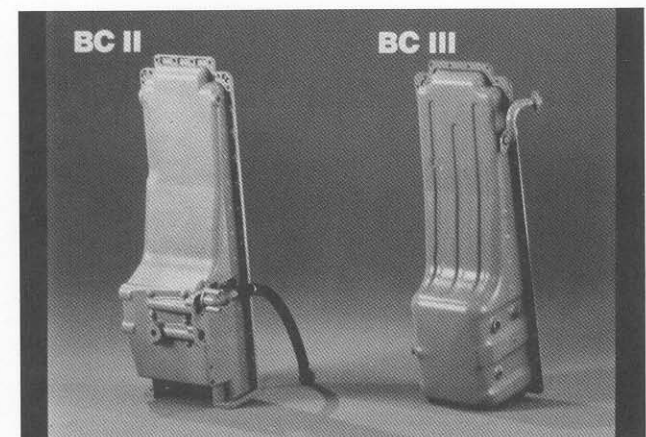
58. 55 pounds lighter than previous models, the Big Cam III's dual oil filter head mounts both a spin-on full flow filter and a spin-on bypass filter directly to the block.

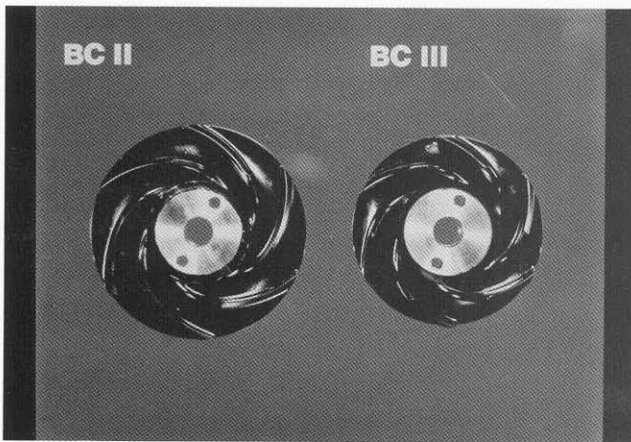


59. A low oil pressure and high restriction alarm has been added to warn the operator that the full flow filter is plugged.

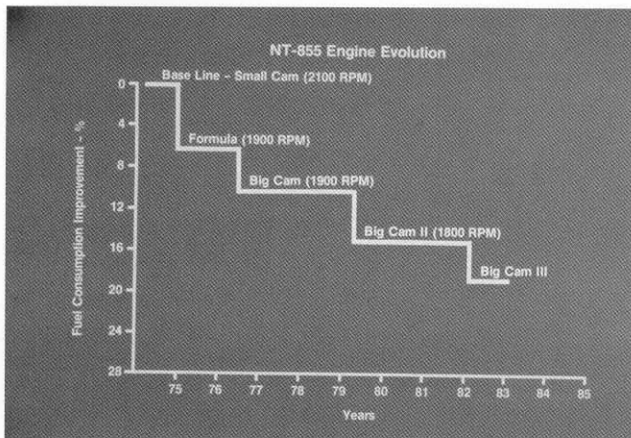


60. Even the oil pan, itself, has been improved. The Big Cam III uses a stamped-steel pan which dampens engine noise and has a short external steel suction tube for greater reliability.

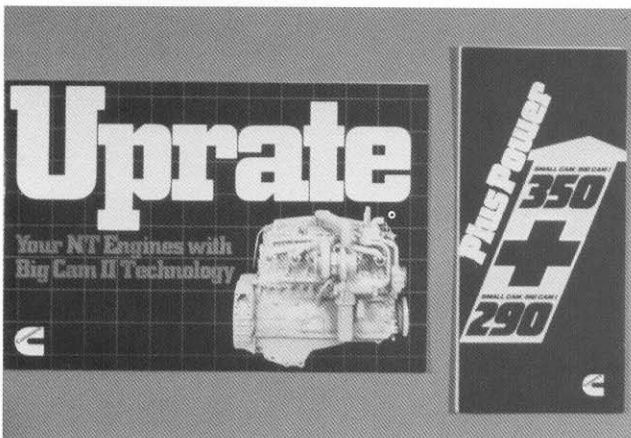




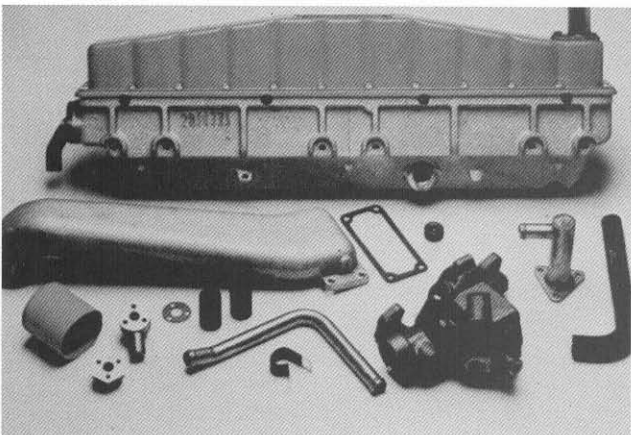
61. Another Big Cam III design change is the water pump. It features a smaller, four inch impeller which is more than adequate to meet the coolant flow requirements yet significantly reduces the parasitic load on the engine.



62. From the NH-250 to the NTC-475, the evolution of the 855 has steadily improved in both horsepower and fuel efficiency. Yet, it has retained a strong family similarity with a high degree of parts interchangeability. As a result, it's quite common to find new technology in an old engine.

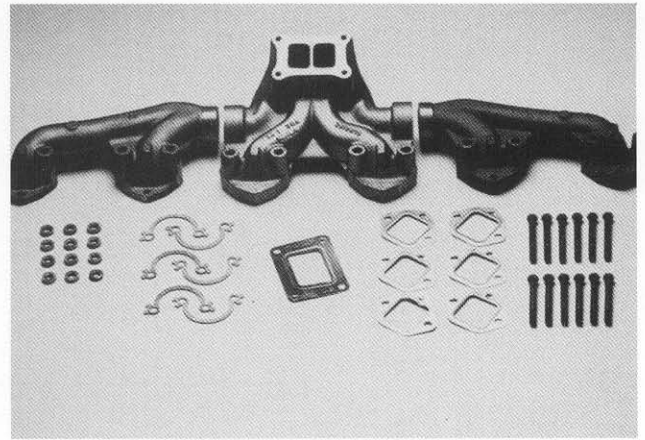


63. Uprating a Small Cam or Big Cam I with Big Cam II technology means improved performance and efficiency, plus extra resale value at trade-in time. However, the engine's original OEPL listing will not be upgraded to reflect the uprate.

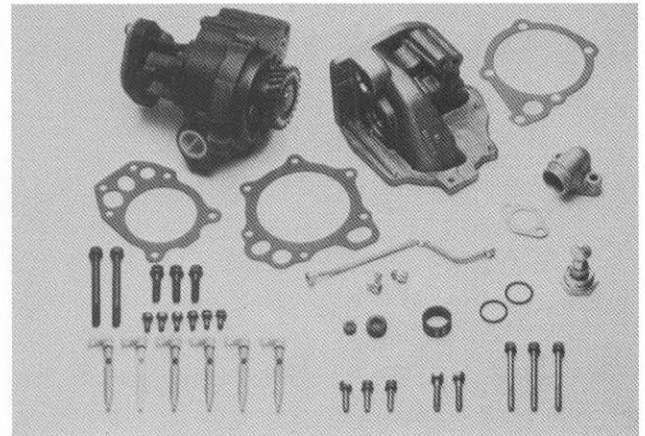


64. Adding an aftercooler means cooler, denser air for improved combustion and burning efficiency, plus increased horsepower.

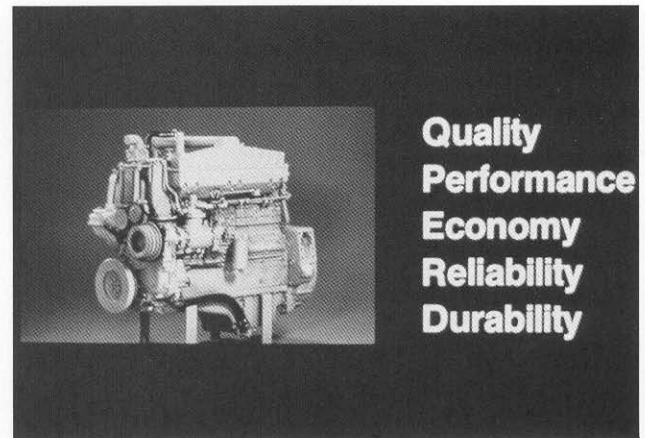
65. The Big Cam II "pulsed" exhaust manifold provides a faster, more direct flow of exhaust gases to the turbo for quicker response and improved acceleration.



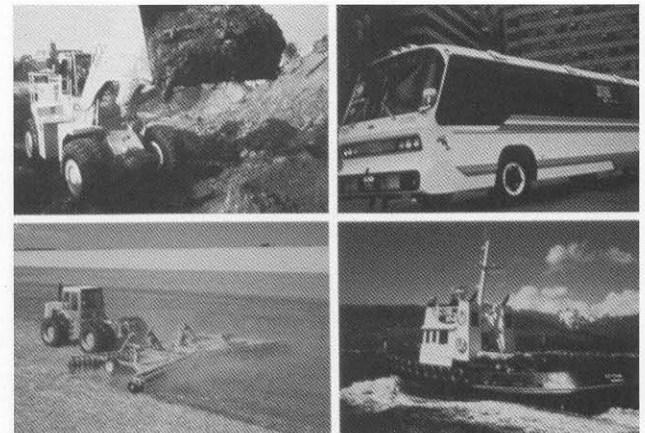
66. Add a DFC lube system kit and get more power out of your engine by reducing its parasitic load, and get better protection from wear and friction by preventing overcooling of the oil. Remember, the higher the price of fuel, the more it pays to uprate your engine.

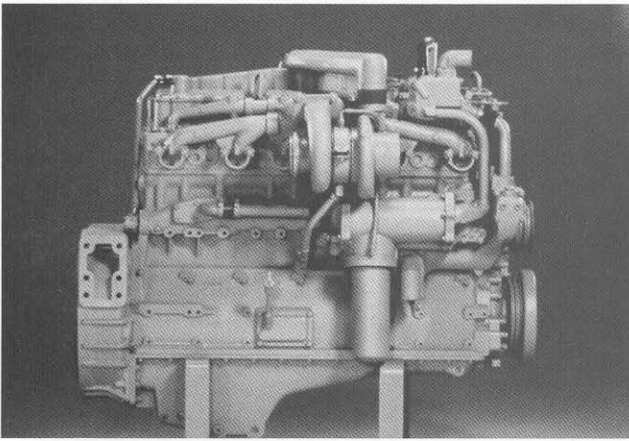


67. Without a doubt, the 855 is a great engine. One in which we take great pride. The 855 is unmatched for quality, performance, economy, reliability and durability. No other engine has served so well, for so long;

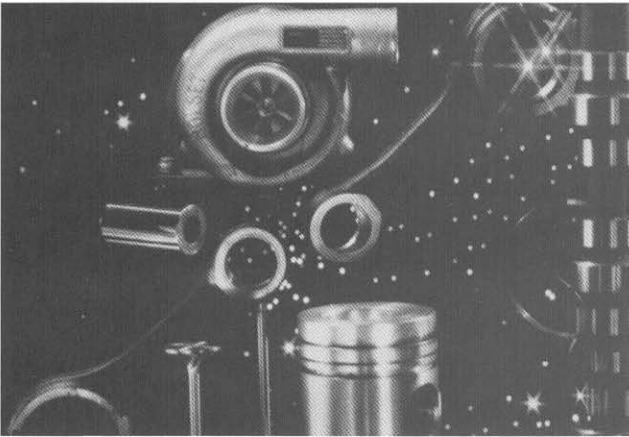


68. . . . and, it will continue to supply our customers' power needs for years to come.





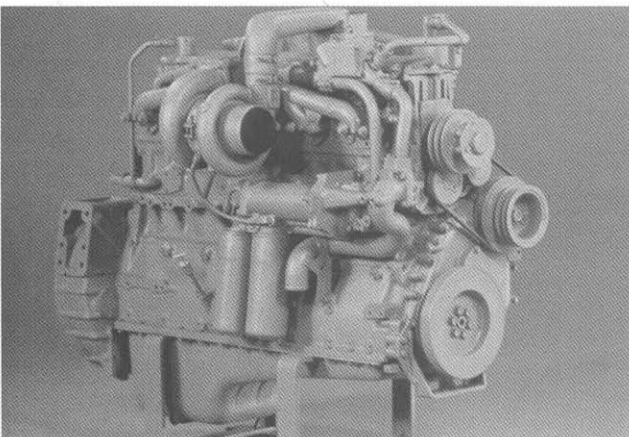
69. But, minor improvements and design modifications can take it only so far. Like its predecessor the H6, the 855 is destined to be replaced by yet another generation, a new engine designed to take full advantage of the technology pioneered in the growth of the 855.



70. Still, no matter how technically advanced the next generation of engines is, it will have to earn its own reputation.



71. Putting in many long miles and years of service before it can ever hope to rival ...



72. ... the Legend of the 855.

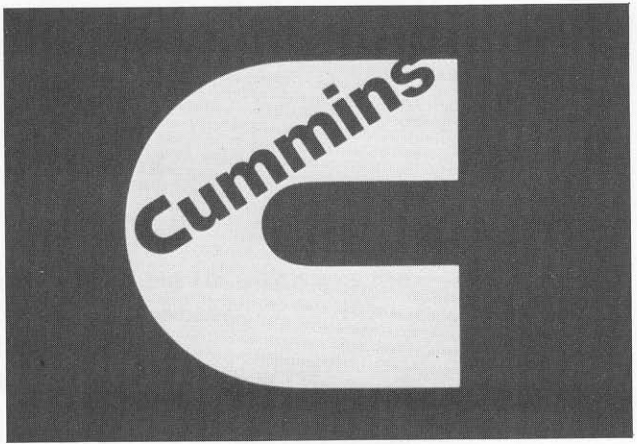
QUIZ

Program: The Legend of the 855

Answer: True T or False F on Left

True False

- 1. The 855 was a diesel engine. True False
- 2. The 855 was a Cummins engine. True False
- 3. The 855 was a diesel engine with a turbocharger. True False
- 4. The 855 was a diesel engine with a turbocharger and a water pump. True False
- 5. The 855 was a diesel engine with a turbocharger and a water pump and a fan. True False
- 6. The 855 was a diesel engine with a turbocharger and a water pump and a fan and a radiator. True False
- 7. The 855 was a diesel engine with a turbocharger and a water pump and a fan and a radiator and a fan. True False
- 8. The 855 was a diesel engine with a turbocharger and a water pump and a fan and a radiator and a fan and a radiator. True False
- 9. The 855 was a diesel engine with a turbocharger and a water pump and a fan and a radiator and a fan and a radiator and a fan. True False
- 10. The 855 was a diesel engine with a turbocharger and a water pump and a fan and a radiator and a fan and a radiator and a fan and a radiator. True False
- 11. The 855 was a diesel engine with a turbocharger and a water pump and a fan and a radiator and a fan and a radiator and a fan and a radiator and a fan. True False
- 12. The 855 was a diesel engine with a turbocharger and a water pump and a fan and a radiator and a fan and a radiator and a fan and a radiator and a fan and a radiator. True False



QUIZ

Program: The Legend of the 855

Answer: True T or False F on Left Margin

- | True | False | |
|-------|-------|--|
| _____ | _____ | 1. The NT-855 is a direct descendent of the H6 which was the first engine to feature four valves per cylinder. |
| _____ | _____ | 2. The HS6 was a turbocharged version of the early H6. |
| _____ | _____ | 3. The NT-FFC engine was the first engine to feature internal oil and fuel lines. |
| _____ | _____ | 4. The FFC water pump has an integral idler pulley for adjusting belt tension. |
| _____ | _____ | 5. Formula concept engine have a reduced rated engine speed but the same rated power output as non-formula engines. |
| _____ | _____ | 6. The Big Cam engine gets its name from its large two inch camshaft. |
| _____ | _____ | 7. Complete sets of Small Cam connecting rods may be used in a Big Cam engine; but because of their larger size, Big Cam connecting rods should never be used in a Small Cam Engine. |
| _____ | _____ | 8. The DFC lube pump uses a feedback signal line to maintain the proper oil pressure. |
| _____ | _____ | 9. The Big Cam II's "Pulse" exhaust manifold has larger passages with smoother bends for the less restricted flow of exhaust gasses to the turbo. |
| _____ | _____ | 10. Big Cam II pistons have a sled runner design which reduces piston rocking and engine noise. |
| _____ | _____ | 11. The Big Cam III feature a dual oil filter head which mounts two full flow filters directly to the block. |
| _____ | _____ | 12. The oil cooler on the Big Cam III has a high efficiency core which has more cooling fins and circulates the oil through the core twice. |

QUIZ

Program: The Legend of the 825

Answer: True T or False F on Left Margin

True False

1. The 825 is a direct descendant of the 8080 which has the
the right to test in four bytes per address.

2. The 825 was a full-sized version of the 8080.

3. The 8255C was the first 8080 to be used in a personal
computer.

4. The 8255C was the first 8080 to be used in a personal
computer.

5. The 8255C was the first 8080 to be used in a personal
computer.

6. The 8255C was the first 8080 to be used in a personal
computer.

PARTS QUIZ ANSWERS

	T	F		T	F
1.		X	7.		X
2.		X	8.	X	
3.		X	9.		X
4.	X		10.		X
5.	X		11.		X
6.		X	12.	X	

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