



ENGINE CLINIC

BY CLARENCE LEE

K+B 40

Hardly a week goes by that I do not receive several letters or phone calls from RC'ers wanting to know how they can get just a little bit more out of their engines in the Formula 1 jobs. As I have tried to make clear in past columns, it is not just the engine, but the combination of engine, fuel, prop, glow plug, and how you run and maintain the engine. The hottest engine in the world would be useless in the hands of someone who did not know how to maintain and take care of it. We have talked about fuel, props, proper cooling, etc., in past columns, so this month let's go into the engine. There are no big speed secrets or radical reworking involved. Just a little common sense and a few minor refinements. The K & B .40 is by far the most popular engine, so our comments will deal with this engine in particular.

Years ago you could go through an engine and open up the ports, change the timing, raise the compression, and usually improve the performance of the engine. Your present day engines come to you with these things already done, so there is not much left to do other than to make sure the engine is absolutely free and set up properly. You must also remember that these engines have already been developed to their maximum power and any increase you come by is going to be

very small. However, every little bit helps, and many times the difference between a good running engine and a real screamer is how it is set up.

These are production engines and must be built to specific tolerances. Although these tolerances are very close, it is possible, through a ganging of tolerances, for variances to occur between engines. For the manufacturer to spend hours trying to make every engine identical would make the cost prohibitive. So, some engines will be a little tighter than others, require a little more break-in time, etc. This month we are going to tell you how to check the engine out yourself, some of the things to look for, and how to keep it operating at top performance.

Let's start with the lower end. Remove the front housing from the case and soak it in a can of lacquer thinner or acetone to remove all castor oil from the bearings. Take hold of the prop end of the crankshaft and see if you can move it back and forth. There should be a slight bit of fore and aft play. Don't panic if you find quite a bit of play. This is good. Some fliers have thought they had bad bearings, but this is not the case. When the engine is running, and up to temperature, the aluminum housing will grow more than the steel crankshaft. If there is no end play to allow for this growth differential, the bearings will

bind up. Ball bearings can be bought with different amounts of internal play: .0002" - .0005", .0005" - .0008", etc. K & B purposely uses the looser fit bearings. Even so, every once in a while an engine will come along with a lower end that is a little tighter than might be desirable for top performance. If it should be tight, because of the pinned prop drive washer, it would be best to return the unit to K & B rather than attempt to work on it yourself. Some of the old U-control speed men can loosen up the bearings by using some emery paper on the shaft and housing, but I do not recommend this unless you have had a lot of experience and know what you are doing. Most of the modelers flying R/C do not have the experience and would only end up making things worse.

You will also want to check the freedom of the shaft by making sure the counter-balance rocks to dead bottom with no drag. Don't let the round crank disc and lack of a cut-away counter-balance fool you. The crank IS counter-balanced. It is cut away internally at the pin end and then covered with the aluminum shell. This method of counter-balancing helps pack the case and increase base pressure. It was originally developed by Bill Wisniewski of K & B and is now being used by several other manufacturers, including Super Tigre and Rossi.

The counter-balance side of the crank should drop to dead bottom by its own weight and rock back and forth several times. If it does not rotate by its own weight, it is too tight. RC'ers who are running Super Tigre .40's should pay particular attention to this as many of your Tigre .40's have no shaft end play and are on the tight side. In the case of the Tigres, it is usually the front bearing and you can free everything up by replacing this bearing. (Of course you will sometimes have to purchase a couple bearings.)

While you have the front housing off of the engine, you will want to check the aluminum prop drive washer and threaded steel stud for run out. Hold the housing with your fingers, supported on the workbench, and spin the shaft. You may be surprised at the wobble at the end of the stud. This means your spinner also wobbles, which means vibration which, in turn, will knock several hundred rpm from the engine. The knurled face of the

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