STRIKE

PRODUCTS

Unit 3, 10 Achievement Way, Wangara
WESTERN AUSTRALIA, 6065
Phone 61 8 9303 4915
Fax 61 8 9303 4916
Email: strike@strikeproducts.com.au
www.strikeproducts.com.au
ABN: 79 591 274 541

PROPOSAL BY STRIKE PRODUCTS FOR AN AFTERMARKET CNC LINERED BARREL FOR THE J ENGINE.

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HISTORY: Early this year, Strike presented a draft proposal to the AKA re possibility of producing a CNC linered cylinder for the J. (Link here).

Then in April, the NKC conducted a planning meeting in Melbourne and from this it was suggested that the 125 classes were progressing satisfactorily, but the lower end engine classes were not. With further discussion two new engine categories were considered. One engine class could cater for the Midget (soon to be referred to as Cadets) & Rookie classes. The other would cover the National & Clubman classes. In both cases each engine would be detuned to drop the performance level to roughly match those of the lower power application, ie Midget & National respectively. Reasons cited for new engine categories being:

- Too many engines that are possibly required in a karters career
- Cost of blueprinting & fitting basic engines with clutches &starters
- Performance variation between engines with cast ports

In addition to this discussion, two alternatives to address the variation in the cast port engines were presented:

- Grind to the line. This has been talked about for many years, but it was finally bought up to the NKC level. It was decided to go ahead with some trials on Yamaha S & J cylinders to understand any gains in equalising the power levels.
- STRIKE presented the proposal of a new cylinder assembly for the J engine incorporating a CNC liner in a precision cast aluminium barrel. This would have a retail price of around 2 sets of tyres.

The meeting concluded with:

- The formation of two teams to investigate engine possibilities for the two discussed categories
- The approval to go ahead and investigate the “grind to line” concept
- The AKA to remain open to a technical update based on test results by STRIKE with a new cylinder

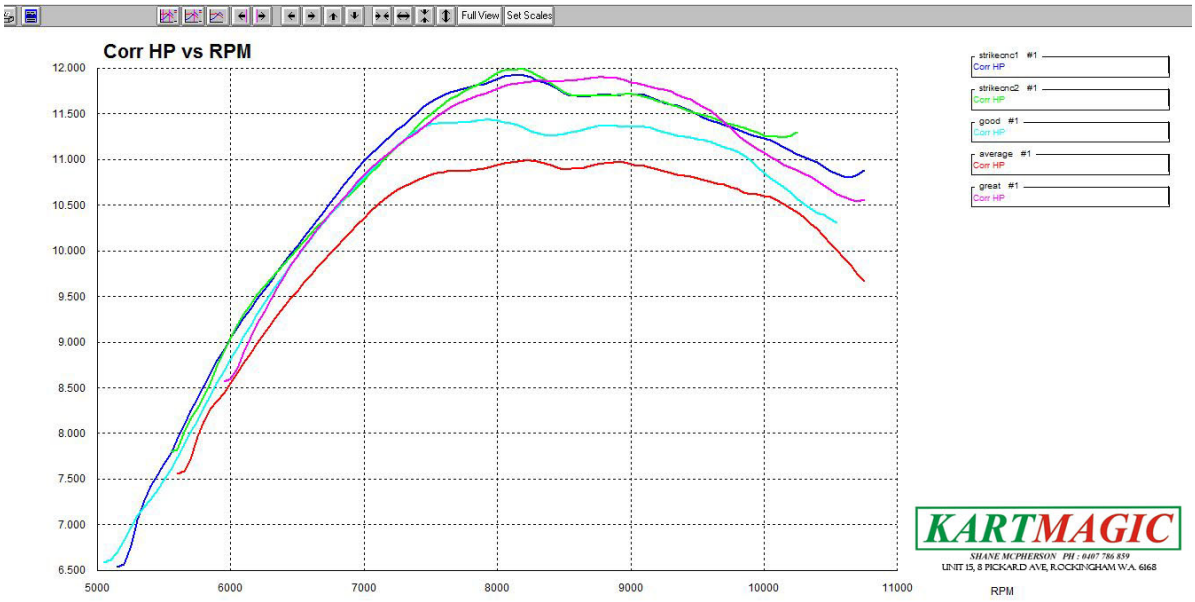
- Approval for the investigation into any future emission legislation that may impact on carburetted 2 stroke engines as currently used in karting (to be undertaken by Ken Seeber)

Subsequently the NKC met in August when:

- The two teams reported on their progress in terms of setting specifications for the new engines
- The "grind to the line" testing was discussed (I believe) generally concluding that it would be a very difficult to control process with little to be gained
- Future emission legislation investigation reported on, where competition engines are seemingly free from emission constraints.
- STRIKE J cylinder proposal was discussed "in camera". Subsequent feedback from the then president suggested that the reaction to this was mixed in the light of new engines, but stressed that the CNC cylinder concept was still an option as per the planning meeting in April.

PRESENT SITUATION: Since that time, STRIKE has continued with the completion of an initial prototype cylinder, this necessarily involved creating a range of patterns and core boxes to create the sand mould for the cylinder external shape and the cores to form the exhaust, inlet and transfer passages. To simplify the patterns to create the external features of the barrel, a J cylinder was cut in half and these halves used as the major part of the pattern to create the "finned" area of the cylinder casting. The intention here was to simplify the production of the prototype. The alternative was to create an entirely new pattern section for this function, but the time and cost would have been prohibitive at this stage of the programme. Whilst we were able to make castings using this method, the external appearance was not particularly great due to the coarse sand required for the compromised mould. However the internals (the key to the design) came out very well and therefore are closely representative of what could be achieved in production.

Two STRIKE cylinders have been dynamometer tested in conjunction with other engines.



There are 5 power curves shown in the graph:

Red: A very average engine, ie below average

Turquoise: An average engine

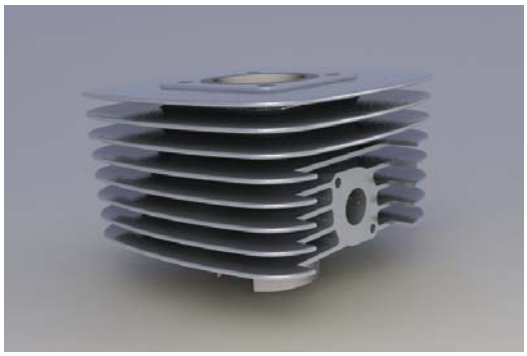
Purple: A very good engine

Green & Blue: STRIKE CNC cylinders on different engines.

From this it can be seen that the STRIKE barrels are extremely close in their performance and its characteristics and compare very well with the "very good" engine.

NOTE: All tests were conducted on the same day, same dyno and on the same fuel. Whilst the power scale is shown, it must be pointed out that the power levels are shown would not necessarily be the same on another dynamometer, they are comparative levels only.

WHAT STRIKE IS OFFERING: In summary, we are offering a new "aftermarket" cylinder assembly for the J engine, this comprising of a CNC machined cast iron liner in a new aluminium barrel with accurately cast ports and passages. This has the power level of the "a really good" Yamaha J barrel, but very importantly, excellent repeatability or parity between each cylinder, just as European linered engines. This, in a bare state, would have a retail price of around $525. The cylinder (as other STRIKE products) would be made in Australia.



The actual cylinder would look similar to the Yamaha cylinder, but would feature slightly larger fins, with all fins of approximately the same equal overall dimensions, very similar to the KT100S cylinder in that respect.

To increase the level of control, it is proposed that the cylinder would have a fixed (or tightly controlled & hence effectively non machinable) length. As with any "CNC liner", the ports in the liner would typically have dimensional tolerances of +/- 0.05 mm (= 0.002 inches = 1 human hair). This effectively eliminates the opportunity for cheating. No grinding would be permitted in the cast passages, however the machined edges would show a very minor factory "breaking of sharp machined edges".

It is also proposed that the removable liners would not be sold separately (but could be fitted, if required, by STRIKE only).

PERCEIVED ISSUES: There are a couple of points here that need to be discussed:

- The obvious one is that the barrel may act as a disincentive to the introduction of a new engine, the argument for this being that the new engine would be ultimately less costly than a J when the purchase price, clutch, starter, exhaust etc are taken into account. The counter argument on this is that most have already bought their engine, clutch starter etc and, in the limit, would ultimately be faced with "dumping" these and buying a totally new engine. It must be pointed out that clutches are not compulsory, so some have not incurred that expense.

- Some refer to the J as being a “waterpump”. This is derogatory as the J is basically an engine based on the MT110 industrial engine which could have been used for a variety of applications, including driving water pumps, but it is certainly not a waterpump in itself.
- Some refer to the J engine as a polluting engine. The J is just a generic, crankcase scavenged, carburetted 2 stroke engine, just as Rotax Max, Leopard, CIK, etc engines. All are dirty polluting engines.
- The cylinder might result in some “$5k” engines being devalued. I am sure the AKA sees as one of its goals as providing an environment where the basis of competition is as equal and fair as possible and, as such, would like to see perceived exceptional engines (in all classes) having their performance equalled by the majority of other engines. Therefore a non issue.

BENEFITS: With thousands of J engines being currently used in Australia, many karters are very content with the performance level, running costs and overall simplicity, however they recognise the varying performance levels from engine to engine. This is basically attributable to the difference between the cylinders, particularly in the transfer ports. In the process of using the “halved” cylinder as the pattern, the cast-in cast iron liner became loose and was removed. This revealed a casting flaw (see adjacent pic) in the aluminium under the transfer port. Whilst this may have been an exception, it does show where variances may lie. It is unknown if this was a good or bad cylinder. The STRIKE cylinder provides a solution to that at a very moderate cost.

THE FUTURE: This is dependent on a positive reception at this time by the AKA. Given this, it is proposed that STRIKE would subsequently present the results of 3 or 4 production version cylinders (as tested on dynamometers by well known engine tuners) that show effectively the same level of performance (as per the prototype) on the same engine. This would only be undertaken by STRIKE on the basis that, given suitable and successful test results, then the AKA would accept and guarantee the allowance of the cylinder to be an optional, but legal AKA aftermarket component. This step would take some months as the production tooling would entail completely new patterns for the cylinder, rather than those based on the J cylinder. At some stage, the AKA Technical Committee would need to be presented with the proposal for comment & involvement. STRIKE would be willing to provide draft wording for the rulebook to cover the inclusion. The cylinder has been designed to conform to all the current J inspection gauges.

Spelling it out, we consider the cylinder would be good for karting and offer no risk to the AKA. The cylinder will have little or no impact on the introduction of the new engines when they come on stream as the Comer, J & S engines, should they (one or more) become superseded, will still be around for some time.

The final decision as to the cylinder’s progress and future is up to the AKA.

Ken Seeber