

Yoke Arm Engine

Sagar Naik, Deepak Naik

Mechanical Engineering

Gogte Institute of Technology, Belgaum & SDMCET, Dharwad

Abstract: The Automobile Industry and the numerous different motor makers need improved motor execution in staying aware of the fundamental changes to secure our wallets and condition. Both the Automobile and Engine Industries are presently attempting to consent to Government prerequisites and are falling behind in staying aware of proposed future guidelines and Government orders that will give the essential headway to secure us and the Earth's condition. The Automotive Industry has mentioned that the US Government diminish the efficiency and outflow prerequisites for future vehicles in light of the fact that, by their very own confirmation, they don't have the innovation to meet such mileage and contamination orders for a long time to come. Yoke arm has changed the entirety of this.

Key words: Combustion rate, Dwell, Efficiency, Pollution, Yoke Arm.

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I. Introduction

The Automotive Industry and the many other various engine manufactures need improved engine performance in keeping up with the necessary changes to protect our wallets and environment. A simple mechanical combination which uses a unique yoke-arm linkage that connects the piston rod to the crankshaft, yet leaves the remaining mechanical arrangement for conventional piston engines relatively unchanged. This design promises to yield high combustion and mechanical efficiencies

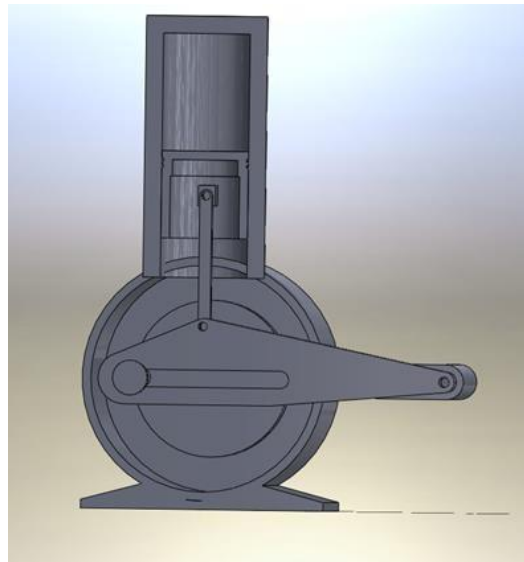
- All piston engines benefits.
- Unprecedented fuel economy.
- Substantial increase in mechanical efficiencies.
- Diesel engines especially want piston dwell.
- Significant power increases.
- Reduced pollution. Major Customers
 - Automobile Industries
 - Research Laboratories
 - Aircraft and locomotive industries

The current I.C. Engine has the following disadvantages

- It produces lot of pollution.
- More piston rod angularity.
- More piston lateral forces which increases friction.
- It does not consume fuel efficiently.

II. Engine Design

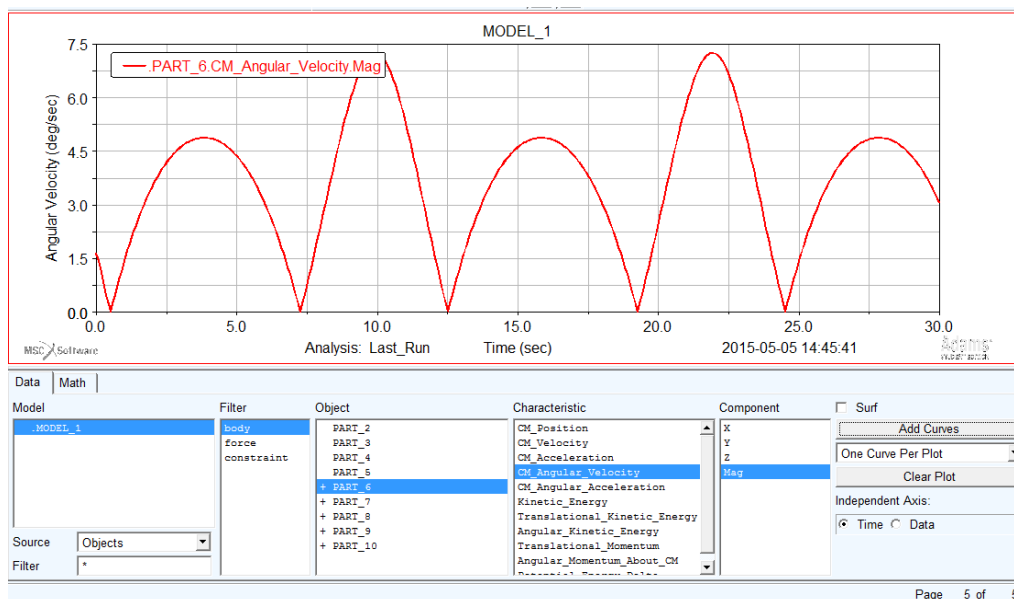
A simple yet effective mechanical combination, never before developed for piston engines, uses a unique yoke-arm linkage that connects the piston rod to the crankshaft, yet leaves the remaining mechanical arrangement for conventional petrol or diesel piston engines relatively unchanged. Yoke arm is a simple structure which replaces the connecting rod of modern day engines. The yoke arm connects the crank shaft with the piston rod. This unique modification in the engine increases the dwelling period of the piston which helps in increased time for combustion. This modification not only helps in better combustion but also greatly decreases piston rod angularity and the associated piston friction, this result is superior fuel economy, increased power and reduced emissions for both conventional crankshaft powered gasoline and diesel engines.



This unique modification can be implemented on any engines with piston and crankshaft arrangement like single-cylinder, V-type, in-line, horizontally-opposed and radial with no restrictions to engine size, shape or application.

This unique modification in the IC engine not just increases the performance of the engine but also reduces wear on the pistons by not producing angular force on the sides of the piston thus reducing friction and heat. As it turns out, piston driven air compressors and air conditioners also become a viable application with significant increases in mechanical efficiencies that require much less power. This new technology offers an easy approach to substantially increase engine performance and fuel economy while also reducing the engine size through increased power. Diesel engines will especially gain a large advantage because the slower burning diesel fuels derive great benefit from the added piston dwell during combustion. Such large increases in piston dwell are not possible with conventional engines or the many other experimental engine technologies you might have read about.

Graph of Arm velocity versus time of Yoke arm shows that during the suction and power stroke there is time delay i.e. the piston dwells giving more time for suction of air fuel mixture as well as for combustion during power stroke. During compression and exhaust the piston movement is comparatively fast which helps in pushing the exhaust gases out of the cylinder at a fast rate.



III. The Problem

The prime problem faced by the conventional IC engines is the pollution due to improper combustion of fuels. This is due to less time for the combustion to occur in the cylinder. Most of the times only part of the air fuel mixture under goes combustion the rest is forced through the exhaust valve.

IV. The Solution

The yoke-arm “linkage” offers a solution to the Automotive Industry and piston engine manufacturers by providing the necessary advancement to help us all keep up with the much needed improvements required to protect the Earth's environment by providing enough dwell for the piston to increase the rate of combustion.

V. Basic comparison with IC engine

SL.NO	Property	Conventional IC engine	Yoke Arm engine
1.	Connecting rod	Present	Absent
2.	Combustion	Improper	Proper
3.	Efficiency	Increases	Decreases
4.	Dwelling of piston	Absent	Present

Maximum increased in efficiency of 40% can be observed in an automobile engine at a dwell angle of 58.5° (at approx. 15% travel of the down stroke)

VI. Advantages

This simple yet effective modification can easily catch the minds of public just like the hybrid engines at a lower cost,

- **Improved efficiency**

This technology incorporates an innovative linkage by adding a yoke-arm between the existing piston connecting rod and crankshaft to improve the performance of all reciprocating engines. The added piston dwell during combustion, made possible by the yoke-arm, provides considerably more efficient combustion and significantly more power.

- **Less Friction on pistons**

The piston connecting rod alignment is now maintained in a path closer to the axis of the cylinder for much less rod angularity which significantly reduces piston and ring friction to increase mechanical efficiency.

- **Advantage for air compressors**

Efficiencies for piston driven air compressors are also substantially improved. Some of the important benefits for compressors will be the noticeable reductions in energy required to operate air conditioning and refrigeration systems. Substantial increases in mechanical efficiencies, due to significant mechanical advantages and reduced piston friction, greatly reduce the power requirements for air compressor, refrigeration and heat pump systems.

- **Effect on environment**

Substantial improvements in fuel economy will in turn decrease our dependence on foreign oil reserves, improve our economy, while also preserving a very valuable natural resource. Petroleum, as a limited natural resource, can now be better utilized.

VII. Disadvantage

The only disadvantage is that the slot in the yoke wears rapidly due to sliding friction. (This can be overcome by using variable metals and by using track-roller bearings instead of slider bearings.)

VIII. Conclusion And Futurescope

The essence of this advancement is the dramatic increase in combustion and mechanical efficiencies just by using a simple modification for the piston rod/crankshaft linkage. It is well known that fuel savings occur at slower speeds and lower engine rpm which correlate to increased piston dwell. The added dwell provided by the yoke-arm makes the engine think it is running at a slower speed. Increased piston dwell provides this "virtual" slower speed advantage, but without the loss in power associated with conventional engines running at reduced speeds and lower rpm. The fuel savings made possible by the yoke-arm might be compared to the effects of a “super” overdrive for automobiles during highway driving. Of course, such a super overdrive with the same fuel savings and power as Yoke arm does not exist in today’s transmissions. However, those familiar with the benefits of overdrive might consider that the Yoke arm Technology in combination with the

transmission overdrives used today, will realize increases in fuel economies and savings that will be quite astonishing. Also, the substantial power gains and significant reductions in exhaust emissions will be a great addition to the substantial fueleconomies.

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