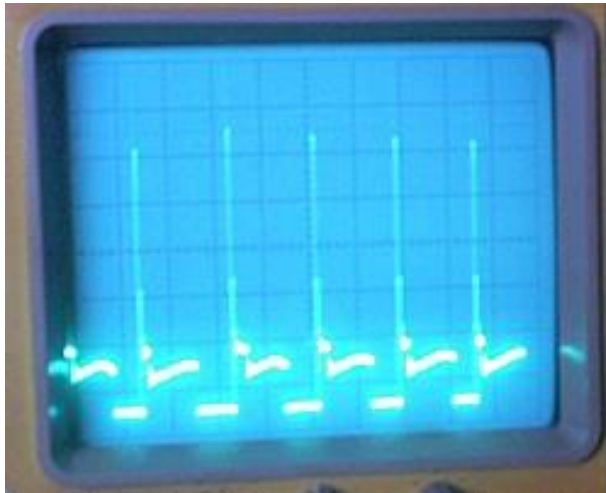


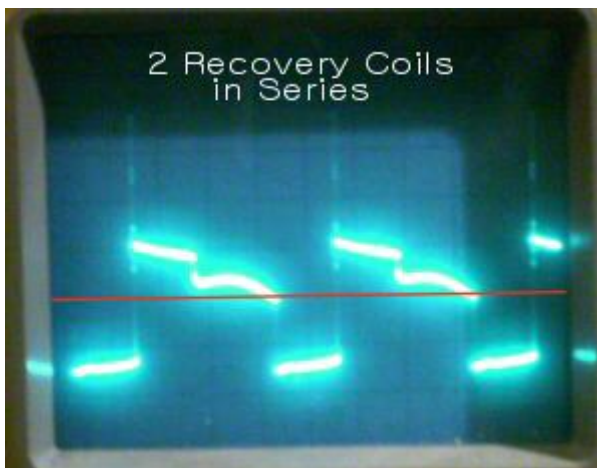
Two Stage Inductance and the Bedini Monopole

note. I do not claim this to be an improvement over John Bedini's original design. I post this purely as a curiosity which some researchers may choose to look into further. However, for anyone starting out I highly recommend sticking with John's original design.

I have been experimenting with my theory of two stage inductance and all test so far have shown the predicted results.



The scope shot above is a fairly standard h-wave generated by a standard trifilar coil where there is one trigger, one power, and one recovery winding. Notice the on-time at the bottom far exceeds the flyback in time duration.



The scope shot above now shows the h-wave of a two separate trifilar coils with their recovery windings wired in series, thus forming what I term as two stage inductance. Notice the extended time duration of the flyback current. This has several implications which I will go into later.

Explanation of Two Stage Inductance

Definition : There is X amount of turns for the power windings and nX amount turns on the recovery windings where n is a figure greater than 1, basically acting as a step up transformer, however the coils don't behave that way when using flyback.

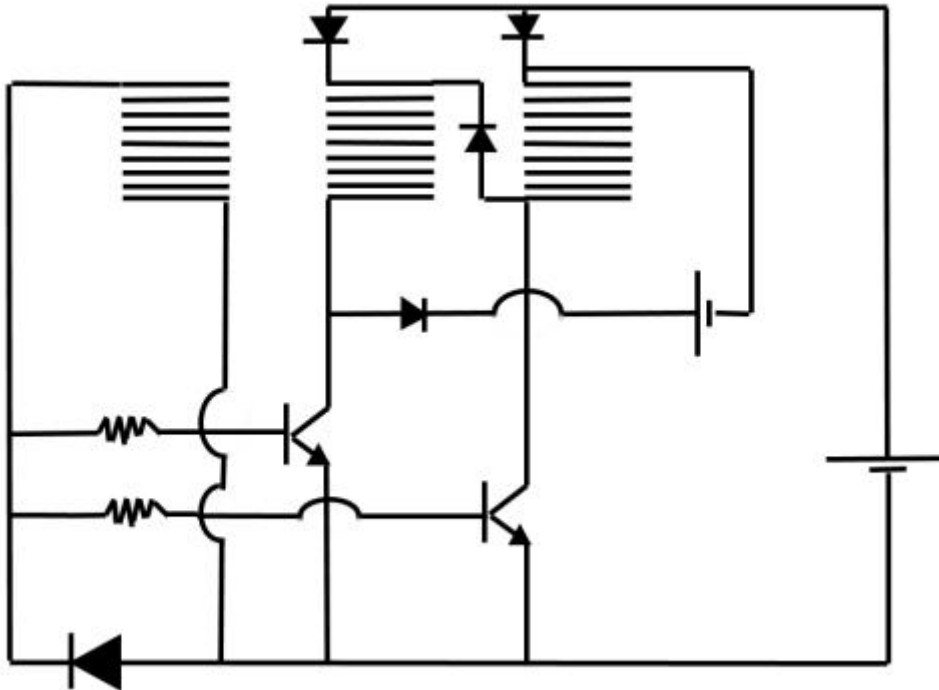
This arrangement allows for there to be less inductance during the coil charge and more inductance when the coil is discharged. The effect of this is that the coil can fully charge in a shorter period of time than a coil of higher inductance.

Let's say we take a 2000 turn (approx) bifilar coil on an SSG. On my test model it shows that it takes about 1.5ms to fully charge the coil to a point where 2 amps is flowing through it. So for 1.5ms we were supplying current to charge the coil to full power. I believe that 1.49ms of the current is waste. I believe the flyback event is independent of the total energy supplied to the coil and is purely dependant on the amount of current flowing through the coil at the point of current termination.

So in theory, if we can get a coil to charge to 2 amps in 1 microsecond, it will supply the same amount of flyback as a coil of equal inductance that took 1.5 milliseconds to charge to 2 amps.

In the real world this is impossible under normal conditions using the same voltage. It is possible to do this by radically increasing the voltage but of course that means supplying more watts according to $W = VI$.

This is where two stage inductance comes in. We could use a coil of lower inductance and that would charge to 2 amps in a faster time period than a coil of higher inductance. Though this would also provide less flyback due to the lower inductance. I decided to try the following circuit.



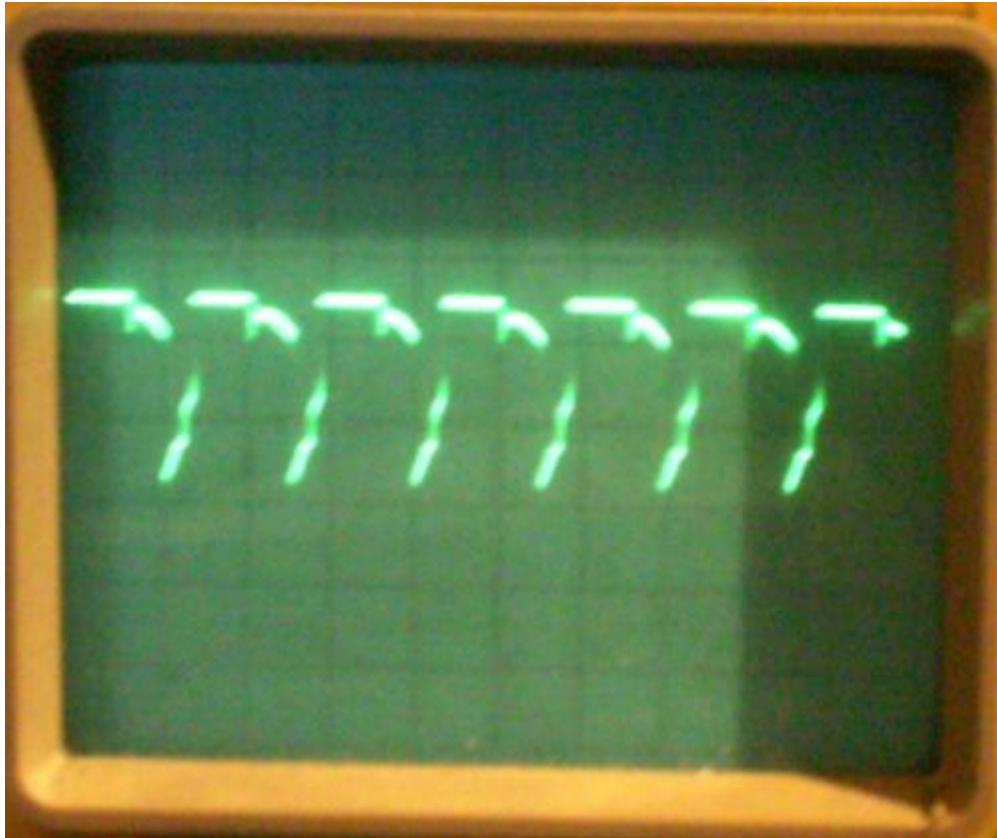
This circuit displays two stage inductance where the inductance during the coil charging process is half of the coil's inductance during discharge. Or to put it another way, the inductance of the coil is doubled during discharge.

I scaled the above circuit up to two separate coils, with four power windings each that were wired in series during coil discharge, but wired in parallel during the charge process. The effect does indeed amplify as the inductance ratio is made greater.

The main problem with the circuit posted above is the amount of extra diodes that were necessary for the circuit to operate and each one of those diodes killed some of the energy and so it wasn't very efficient, but it did display the effect.

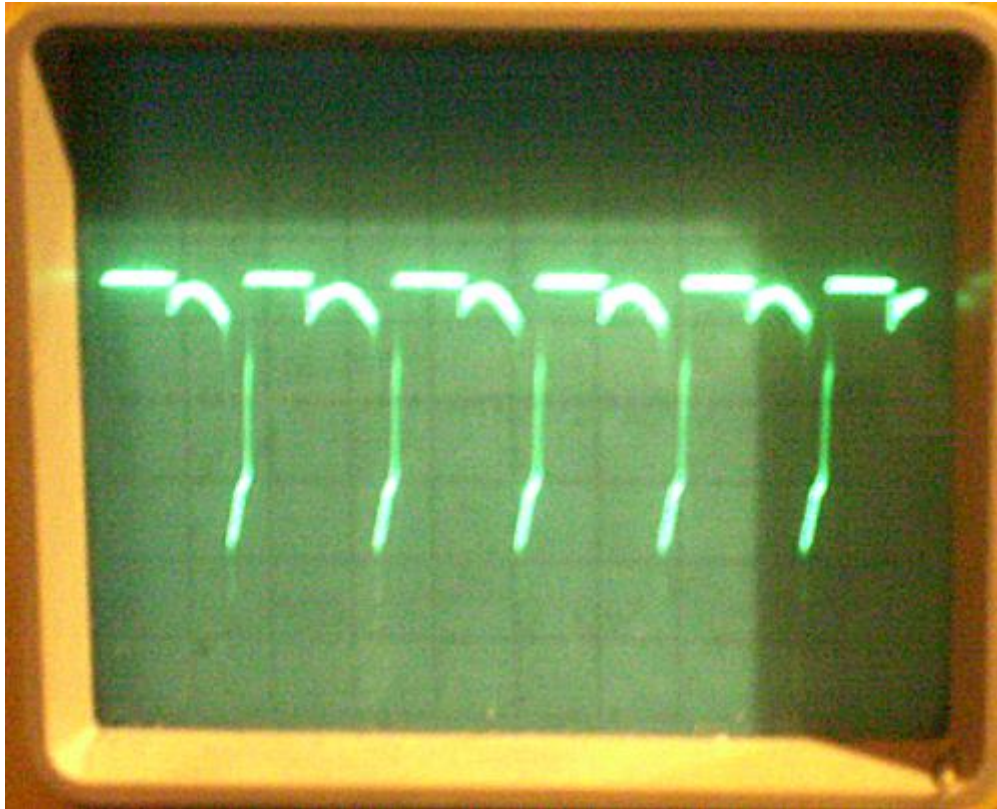
To improve efficiency I switched to recovery coils which allowed me to further increase the inductance of the discharge, and I could eliminate all but one of the diodes. This greatly improved the efficiency and amplified the effect.

The first configuration I tried with recovery coils instead of diodes was two power windings on each of the two coils and two recovery windings on both coils wired in series so the inductance (or step-up) ratio is 1:4. The wave form was as below:



The time setting on the oscilloscope was 1 millisecond per square so pulse duration was approximately 0.2 milliseconds and the flyback duration was 0.8 milliseconds. Amp draw was at 360ma and the 6 magnet rotor was going at 4850rpm. This is an incredible speed for such a small input. In a standard configuration my best RPM was 2800 and the amp draw was 480ma and the pulse duration was 1.5 milliseconds so there was a significant improvement using this alternative design.

I then tried just one power winding on each of the coils and used the other three windings as recovery coils wired in series creating a step-up ratio of 1:6. The wave is as follows:



The scope shot above is on the same settings as the previous one so pulse duration is approximately 0.12 milliseconds and flyback duration is approximately the same though slightly longer duration. Amp draw went down to 210ma and rpm only went down to 4150rpm. To me, this shows that the flyback is doing most of the work to maintain rotation.

note. I notice there is a slight discrepancy between my oscilloscope and my tachometer, however the results should still be accurate for comparison.

Although the flyback is of longer duration that does not mean it is carrying more power.

Let's say for example that between the two coils the peak current at termination was 4 amps. With a 1:6 step up configuration (and assuming a perfect scenario which it obviously isn't) the peak current going through the recovery windings will be 0.666 amps, or one sixth of the peak current that was going through the primary windings. So this does not amplify the power coming from the SSG, it merely extends the time duration of the flyback, however my tests indicate that this configuration may have far better COP than a standard trifilar Monopole configuration.

But let's take a closer look at what is actually happening.

By lowering the inductance of the primary windings the coil will react a lot faster and therefore the full force of the magnetic field will hit the rotor magnet when it is in closer proximity to the stator and so that makes it more mechanically efficient. But it gets a bit better. As I said earlier, I believe the flyback is doing a lot of the mechanical work.

In the first stage, when the coil is charging, we have two 500 turn coils charging up to a peak current of 2 amps each (4 amps in total). Then we shut off the power. Normally, if the coil is set up for 1:1, the flyback will quickly vanish and have relatively little influence on the mechanical output. This is because the pulse duration has to be extended in a one to one configuration and so the rotor magnets are too far away from the stator to be effected by the flyback.

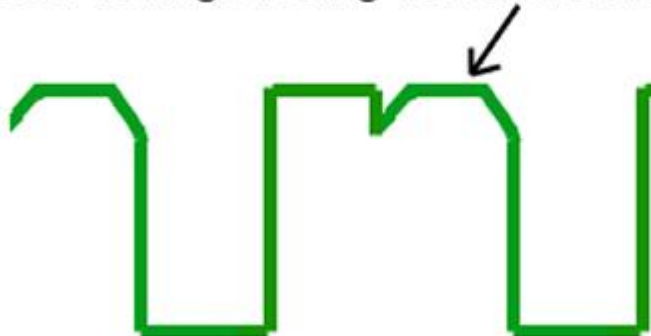
However, with two stage inductance, we can cut off the current while the magnet is still in close proximity to the stator. Normally this would have a negative effect on rpm as the rotor magnet will be attracted back to the stator and cause drag*, but in this configuration we then have a 3000 turn coil with a peak current of 666ma (assuming perfect inductance) and so it prolongs the existence of the stator's magnetic field long after the supply current has been shut off.

(* In a normal trifilar configuration this couldn't occur as it will results in multiple pulses per magnet pass until the rotor magnet is far enough away from the stator so as not to be attracted backwards.)

Additional Notes

You may notice that the induced voltage in the recovery windings from the rotor magnets approaches 10v. If I were to add another coil identical to the other two coils I believe that mechanical energy from the rotor could be converted back to electrical for charging the battery. If have done a test to see if this will work in principle by adding larger magnets to the rotor. Mechanical energy is indeed being extracted. Unfortunately I didn't get a scope shot of it but it appeared as this:

Induced voltage being recovered by batteries



However, the recovered mechanical energy was insignificant compared to the energy recovered from the coils. I estimate it to be approximately 5% or less. With more coils, or stronger magnets, it may be possible for more energy to be extracted.

Conclusion

The obvious benefit of this configuration is more mechanical work done for less input by the operator though I intend to do more research into these set ups as there may be more happening than meets the eye but I do not as yet have any conclusive results, only suspicions.

A thought that has crossed my mind is that a coil that charges in a shorter time period will be putting more stress on the surrounding vacuum and so it is possible that this may allow for more energy to be extracted from that source.

Also, if I am right that the energy from the flyback is independent of the total energy put into the coil and fully dependant on the amount of current flowing through the coil at the point of termination then it is possible that more energy could be extracted from the flyback then the energy required to fully charge the coil if pulse duration could be made short enough. However, in the real world, I haven't found a way to get a coil to charge to the same level in a shorter time period without reducing inductance or increasing voltage. But the possibility is there.

Sephiroth, 15th October 2008
www.youtube.com/introvertebrate