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RPTC TECHNICAL MAGAZINE

RANE TECHNO-VATE

RANE POYTECHNIC TECHNICAL CAMPUS

LET'S TAKE THE FIRST STEP TO MAKE THE "SKILLFULL INDIA"…

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MECHANICAL ENGINEERING

1. DESIGN AND FABRICATION OF MULTI-PURPOSE ROBUST CUTTING MACHINE FOR AGRICULTURE

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Presently the agricultural industry has come up with vast range of equipment for efficient farming. At the same time the main drawback is that it is not affordable for the farmers with poor economic background. This machine can be used for cutting variety of crops and helps the small scale farmers with the cost effective technology. The newly designed crop cutting unit works without using any type of fuel or electrical energy and can be operated with mere muscle force. This equipment uses combined blades for efficient crop cutting. The present designed and fabricated crop cutter can be used to cut the straws of different food grain crops like Paddy, wheat and grass. The crop cutter is an application of pure mechanical knowledge to improve the quality of work with minimum labour and time.

Key words: *Cutting Machine, Robust, Agriculture, Multi-Purpose*

Introduction

In India agriculture has been facing serious challenges like scarcity of agricultural labour, not only in peak working seasons but also in normal time. On the other hand, cultivable land is decreasing due to urbanization. Agricultural mechanization is one way to overcome this problem. The main agriculture crops in India are groundnut, paddy, sugarcane and wheat. Some of these agriculture crops are explained below:

For plantation of sugarcane, the sugarcane seed has to be planted in wet soil. This sugarcane seed is a part of sugarcane. In traditional way farmers use to cut whole sugarcane in 5-6 parts, in such a way that each part having 2-3 seeds. Then those cut parts are planted in soil. Farmers use to cut these straw parts as a food for pet animals like buffalos, ox, cows and goat etc.

Groundnut is one of the important agriculture crops in India. Farmers separate groundnuts from its plants manually. This requires more manpower as 20-30 labours per acre, and also this is time consuming operation. Rice is one of the main foods of India. Paddy is the initial stage of it. The removal of paddy from paddy plant is called as paddy stripping, and this is done by several methods. Most of the time farmers use to remove paddy from its plant manually.

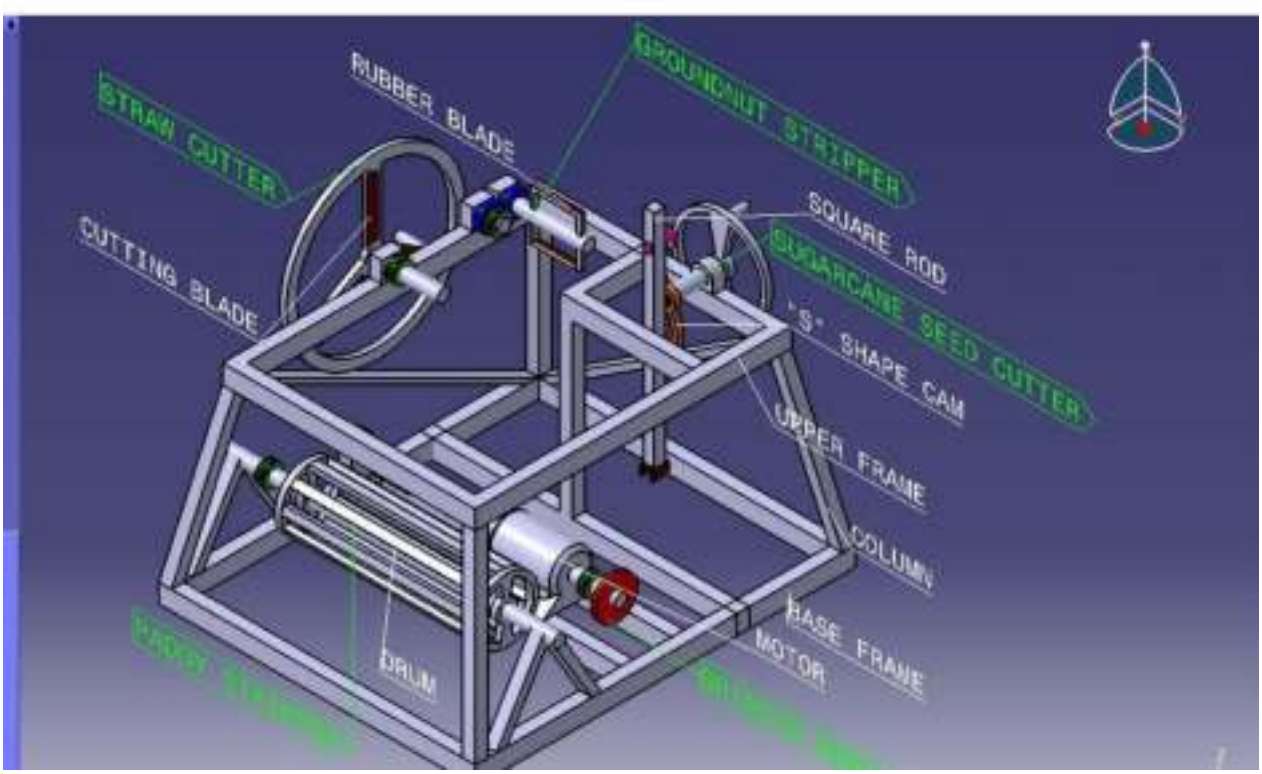
OBJECTIVES

- *To perform more than one operation at a time.*
- *It is suitable for high volume production of agricultural crops.*
- *To reduce the processing time and labour cost.*
- *To overcome the problem of labour crises.*

METHODOLOGY

The number of components required for the project are fabricated and assembled separately to form a low cost energy efficient multi-purpose robust cutting machine.

In this project, the idea is to make mechanization of agricultural designed and fabricated machine with the following operations.



METHODOLOGIES USED IN THIS MACHINE ARE EXPLAINED BELOW:

1) Sugarcane Seed Cutting:

In order to realize anti-damage bud and automatic cutting of sugarcane in a single bud segment, a sugarcane cutting system based on machine vision is designed. The seed cutting system includes a mechanical part, electrical part, and visual processing part. The core of the system uses machine vision to identify the segments of sugarcane stalks. The feasibility of the system and the identification effect can be better verified based on designing a prototype for seed cutting. The results of the off-line identification of sugarcane stalk segments show that the recognition rate is 93% and the average time is 0.539 s. The throughput capacity of the developed system with single cutting unit can range up to 2400 buds/h. The online test illustrated that the position precision of

cutting point can meet the demand of agriculture, and the rate of bud damage is zero.

2) Groundnut stripper:

Stripping is done by holding the pod portion of a bunch manually over spiked cylinder. It is suitable for stripping of groundnut pod from the harvested crop. It saves 60 percent labour and pod separation time which ultimately reduces the cost of cultivation. The vines are not fed into the machine, so that the fodder value of the crops can be maintained and used in lean season also. Though there are several models of groundnut pod stripper available in various research institutes, this particular machine has the advantage of running on 0.25 HP electrical power, stripping and winnowing are done simultaneously and is portable (35 kg).

3) Straw Cutter

A straw cutter is a mechanical device used to cut the grass, sugarcane stalk, hay into small pieces mixed together with other forage grass and fed to horses and other animals. This improves animals' digestion and save their chewing energy. Straw and operations were replaced by tractors in the 1940. After that new machines exists which were tractor driven which easily cuts the forage and collect it into trolley. After that motor operated chaff cutting machines is used to overcome the problem of tractor driven machines. Those machines requires fuel and also large in size.

4) Paddy stripper

The harvester was developed to accomplish stripping of paddy panicles and collecting the stripped paddy crop without harvesting the straw. The stripped paddy crop requires a partial threshing and winnowing. The biometric properties such as plant height, panicle dropping height, panicle length in mm and number of tillers were measured. The stripper rotor height range was selected on the

basis of plant height and panicle dropping height. The abrasion resistant and flexible industrial rubber material was used for stripping element.

CONCLUSION

In multipurpose robust cutting machine, four individual operations are combined. By using this machine the problem of labour crises can be reduced, because it makes the process faster. It performs more than one operation, so processing time can be saved. In the sugarcane seed cutting operation wastage of sugarcane can be controlled and cut seeds are easy to sow. In groundnut stripping operation instead of 10-20 labours per acre, only two labours can separate the groundnuts from plant by using this machine. In the paddy stripping operation while separating paddy from plant wastage in traditional methods will be more. By using this machine wastage will be less and instead of 5-6 labours, only 2 labours can do the same operations at a minimum time. If these machines are used by its maximum, the farmers can overcome the labour cost with a faster process.

2. INCREASING POWER DENSITYUSING DC LINK CHOPPER IN ADAPTERS

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Fly back switch-mode power supplies (SMPS)are popular for low-power and medium-power external power adapters due to their light weight and low cost. While the demand for more compact adapters for notebooks, tablets and gadgets is continuously increasing, there are physical limitations in the efficiency and power density that can be achieved using the Fly back topology. One major issue is the DC link capacitor, also known as bulk cap; its volume represents a big part of the adapter, its power dissipation is a major loss and its life expectation is the main factor in the reliability of the adapters. This paper introduces an innovative solution for reducing the value, the volume and the power losses of the bulk capacitor; as an extra benefit of this solution, the power factor of the adapter is also improved and the conduction losses associated with the front end of the converter are significantly reduced.

- ***Key words: Adapters, SMPS designers, Fly back topology***

INTRODUCTION

The 65W converters are among the most popular adapters used for notebooks and Fig. 1 presents a prototype of a 19.5V / 3.33A adapter in a 90 x 45 mm footprint and 16mm total thickness. The main obstacle in further reducing the profile is the electrolytic capacitor used for DC link, in this case an 110µF /400V (50mm long and 12.5 mm in diameter). While semiconductor devices are continuously improving, providing more efficient and more compact solutions, the electrolytic capacitors are progressing much slower, becoming the main limiting factor in achieving smaller and more efficient adapters. New switching devices are promising higher operation frequency, which will allow the use of

smaller transformers, leading to better performances in a smaller footprint.

The Flyback topology will highly benefit from these advances, remaining the simplest and cheapest solution for AC/DC converters under 75W, where good power factor is not required. Recent improvements of Flyback topology performances and applications are related to power limit control, multi-output control, primary side sensing, acoustic noise and EMI.

Figure 1: Adapter Prototype

Some effort has been done for low power applications to eliminate the need for inductors and bulk capacitors, but such solutions are very restrictive; the Flyback topology remains the most flexible, simplest and cheapest for mass production. Reference presents a high-frequency auxiliary switch solution to be used with single stage PFC-Flyback topology; the present paper introduces an alternative low-frequency chopper switch with clear advantages. Following the trends of near future technological evolution, it is desirable to increase the use of semiconductor devices and to reduce the employment of bulky electrolytic capacitors in Flyback based adapters.

The DC link chopper method presented herein makes use of the extra semiconductor devices in order to reduce the value, volume and losses of the bulk capacitor.

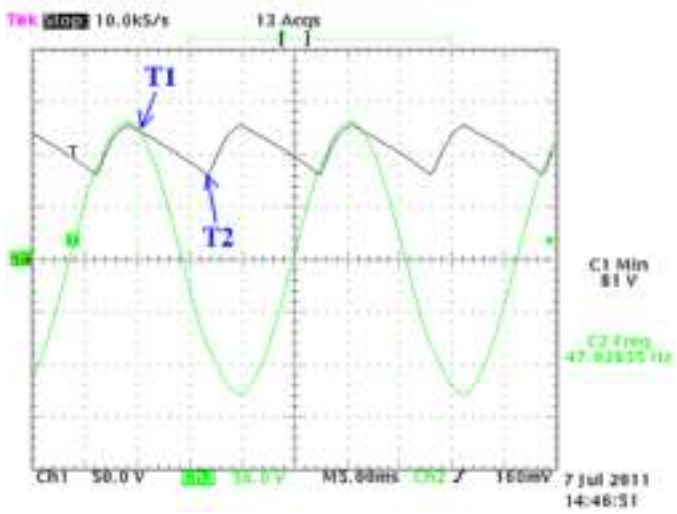

Figure 2: Bulk Cap Voltage Ripple

II. BULK CAPACITOR LIMITATIONS

The main role of the bulk capacitor is to store the energy between the peaks of rectified AC mains; while the Flyback topology is suitable for large input voltage range (usually 5:1), it does require a minimum voltage in order to operate, hence the need for energy storage. The need for wide AC input range forces a minimum voltage of 400V for the bulk capacitor (264Vac), while the high capacitance value and high RMS current capability is required for the lower input voltage extreme (90Vac/47Hz).

Usually the conduction losses of the front end, bridge rectifier and bulk cap are highest at low line input, resulting in the lowest efficiency of the adapter and the worst thermal case. The voltage ripple (which is correlated with the current ripple) of the bulk capacitor is maximum for the lowest input and lowest operation AC frequency; in the case of the 65W prototype, the bulk cap voltage (101 µF effective capacitance).

drops to 81V from 126V peak (Fig. 2, Chan. 1 is bulk voltage

50V/div, Chan. 2 is AC voltage 50V/div). Considering output power Po, bulk value Cbk, T1 to T2 the discharge interval and VT1 and VT2 the extreme

voltages, the energy balance for the cap ideal.

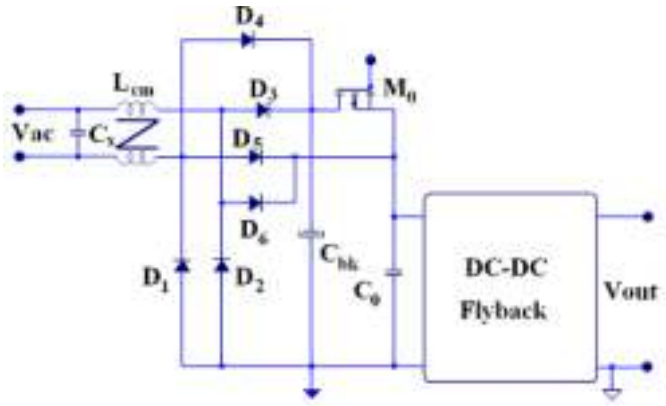

Figure 3: Dc-link chopper

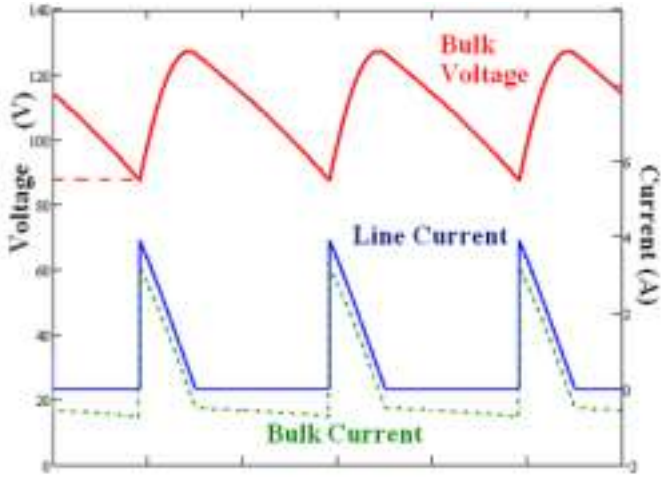

Figure 4: Bulk voltage and current

As demand for better efficiency and smaller adapters is increasing, it is clear that a way of reducing the mentioned conduction losses at 90Vac is needed. One way to achieve this goal is to reduce the amount of stored energy in the bulk capacitor, by directly using more energy from the line.

III. DC LINK CHOPPER

A. Theoretical Considerations Fig. 3 presents the proposed method of using more energy directly from the AC line (using D5 and D6) and reducing the storage energy requirements in the bulk capacitor, by means of chopping the connection between DC stage and the DC link of the bulk cap, using the rule of

minimum voltage ripple. Cbk is charged by the bridge rectifier D1-D4 and it is connected to the DC-DC stage through a MOSFET M0, which is chopping the connection at twice the AC line frequency (94-120Hz). D5 and D6 are feeding directly the DC-DC converter when M0 is off, so part of the energy is taken directly from the AC line. Co is a small value capacitor for high frequency filtering of the DC-DC input.

Fig. 4 shows the simulated results for bulk voltage, bulk current and line current, having a minimum voltage of 87.6V, a bulk rms current of 0.958A, a line rms current of 1.09A, and a power factor of 0.497 (classical approach,110µF, 90Vac/50Hz). Fig. 5 shows the simulated results with chopped DC link, using a smaller 82µF bulk cap; the minimum voltage is 90.5V, bulk rms current is down to 0.702 A line rms current is down to 0.867A, and the power factor is increased to 0.722 (82µF, 90Vac/50Hz) Overall the conduction losses on the bulk capacitor are reduced to almost half (54%) and the front line conduction losses by one third (63%). The chopper switch M0 has only a fraction of the bulk current, its rms value being modest (0.368A); therefore, the extra losses due to M0 are very small. The switch requires a high side driver, but the driving losses are negligible at 120Hz. D5 and D6 do not add extra losses because they share the average current with D3 and D4.

B. Control Methods The chopper switch M0 has to be driven at twice the AC line frequency (94-120Hz) in such a way that the energy use from the bulk capacitor is minimized; at the same time the DC input voltage ripple for the DC stage (Flyback) needs to be as small as possible in order to improve the efficiency of the stage. Therefore, the optimum performance is achieved when the two minimum levels (for each semi-cycle of AC line) of the DC input of the Flyback stage are identical (very close in practice). The desired control can be achieved by analog means or digital means. While the analog solution may be more straight-forward, the digital solution offers more flexibility and reduces the real estate demand.

The control algorithm has to take in consideration the load level and the AC line frequency and amplitude. As the highest stress of the bulk capacitor appears at 90Vac/47Hz and full load, it is natural that the benefits of the DC link chopper decrease for lighter loads and/or higher AC line frequency, respective for higher AC line voltage level.

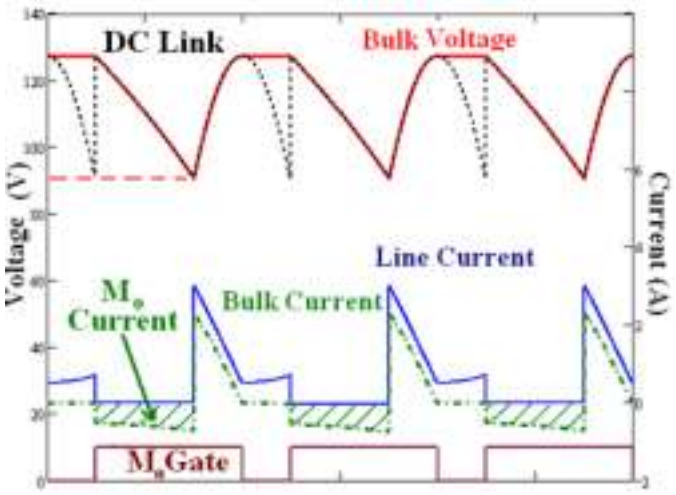

Figure 5: Chopped DC link voltage and current

As shown in Fig. 5, the timing of turn-on for the Mo switch is critical, because it directly determines the first minimum of the DC input voltage and indirectly the second minimum of the same voltage. Hence the control algorithm has to precisely command the turn-on. One way to achieve this goal is by monitoring the voltage difference between the bulk capacitor and the DC stage input during the OFF state of Mo switch. The turn-off timing is not so critical, as long as the chopper is disabled after the AC line is caching up with the bulk capacitor voltage and before of the peak of the AC line. During this large period of time the bulk capacitor is charging from the AC line, therefore its voltage is very close to that of the D5/D6 rectified voltage. The ON or OFF state of Mo switch does not have a significant influence on the adapter operation during this period. The control circuitry is ground referenced and a high-side driver is used to command the chopper MOSFET.

The floating driver bias requires an independent bias; witch can be created using an auxiliary winding from the Flyback transformer or even a direct tap from the primary winding of the transformer.

Because the floating bias is not available at the start-up of the adapter, it is necessary to time the start-up of the adapter close to 45o/225o phase of the AC line in order to allow the adapter enough time to start from the AC line.

IV. EXPERIMENTAL WAVEFORMS

The original 65W adapter has been modified by reducing the bulk capacitor to 82µF (40mm length and 12.5mm diameter, 72 µF effective capacitance), which represents a 20% volume reduction; a 0.385Ω/600V mosfet (Thin Pack) has been added as a chopper and two 2A/800V diodes were added (D5 and D6) for the extra rectification path. The two diodes do not need to be fast if the timing between turn-on of the chopper switch and the Flyback switch is done correctly and the reverse recovery of the diodes is eliminated. Fig. 6 shows the waveforms for the original adapter (101µF effective bulk cap value) at 65W load and 90Vac/47Hz input. Chan. 1 is the AC line voltage (black, 100V/div), Chan. 3 is the AC input current (red, 2A/div) and Chan. 4 is the DC stage input voltage (blue, 50V/div). Fig. 7 shows for comparison the waveforms for the DC link chopped adapter (72µF effective bulk cap value) at 65W load and 90Vac/47Hz input. Chan. 1 is the AC line voltage (black, 100V/div), Chan. 2 is the Mo gate signal (green, 10V/div), Chan. 3 is the AC chopped DC link version delivers 90.7% efficiency in the same conditions.

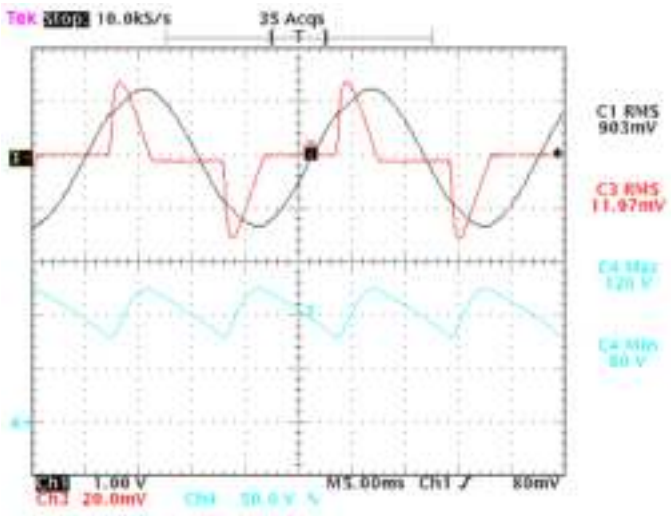

Figure 6: original adapter waveforms

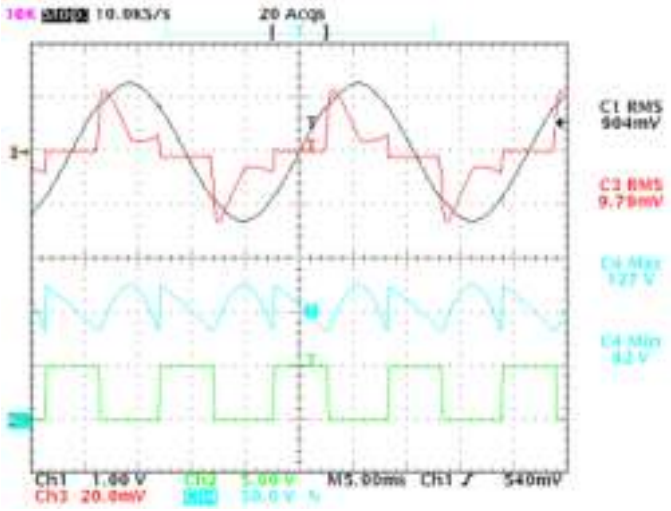

Figure 7: chopped dc link adapter waveform

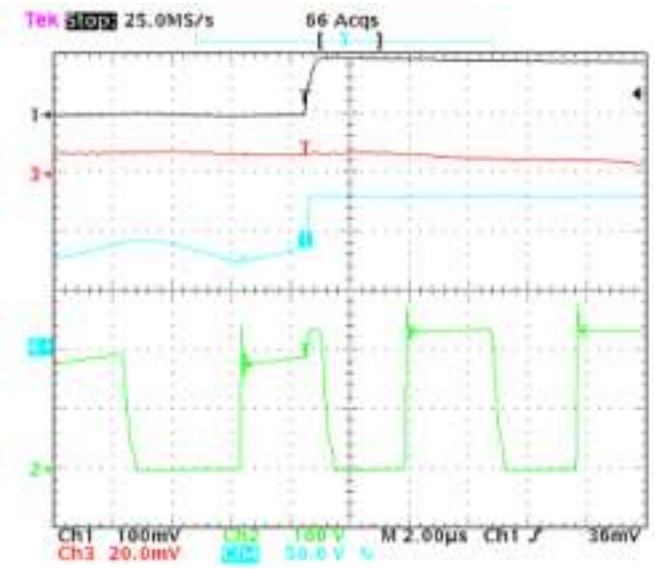

Figure 8:M0 turn on waveforms

input current (red, 2A/div) and Chan. 4 is the DC stage input voltage (blue, 50V/div). It is obvious that lower rms input current value is obtained, while a slightly better voltage ripple is seen by a smaller value bulk cap (lower losses). The effective power factor has been improved from 0.64 to 0.77, while the squared ratio between the two input rms currents (measured with a precision power analyser) is 0.69 (31% reduction in conduction losses for the front end of the adapter). This result is close to the theoretical prediction (37% reduction). The direct efficiency gain is about 0.5% - original adapter efficiency at 90Vac/47Hz and 65W output is 90.2%, while the chopped DC link version delivers 90.7% efficiency in the same conditions.

Fig. 8 shows the turn-on of the chopper switch Mo during the turn-off state of the Flyback switch. Chan. 1 is the gate voltage of Mo (black, 10V/div), Chan. 2 is the drain voltage of the Flyback switch (green, 100V/div), Chan. 3 is the input AC current (red, 2A/div) and Chan. 4 is the input voltage of the Flyback stage (blue, 50V/div). It is important that the turn-on timing of the chopper switch coincides with the OFF state of the Flyback switch because during that period there is no current flowing through the D5/D6 diodes and Mo switch is

delivering only the current required by Co (Fig. 3). Only under these conditions the switching losses of the chopper can be minimized, as the reverse recovery of D5/D6 is eliminated.

The switching losses of the chopper are very low to start with because of the very low frequency of operation (94-120Hz). For the same reason the driving losses of M switch are very small. Fig. 9 shows the turn-off of the chopper switch Mo during the turn-on state of the Flyback switch. Chan. 1 is the gate voltage of Mo (black, 10V/div), Chan. 2 is the drain voltage of the Flyback switch (green, 100V/div), Chan. 3 is the input AC current (red, 2A/div) and Chan. 4 is the input voltage of the Flyback stage (blue, 50V/div).

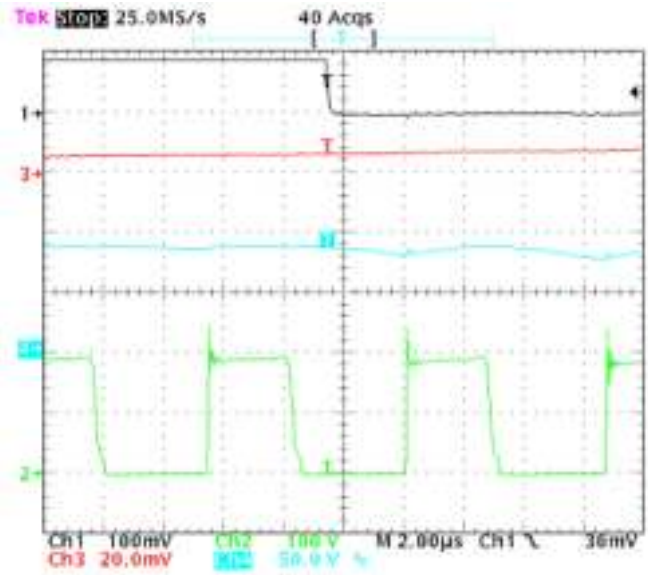

Figure9:M0turn-off waveforms

The turn-off timing of the chopper switch is not critical, because the capacitor,Co is softening the transition. Mo is turning off with zero voltage across it and very small current (close to zero). At the same time D5/D6 diodes are already conducting current. Therefore, there is no major perturbation in their sate.

V. EXPERIMENTAL RESULTS

The efficiency and power factor were measured for full load and 90Vac input, at 47Hz, 50Hz and 60Hz, 100Vac/60Hz, as well for 115Vac/60Hz, and the results are shown in Table 1.

TABLE I.

	Original Adapter		Chopped DC Link	
VinAC	*Efficiency (%)*	*Power Factor*	*Efficiency (%)*	*Power Factor*
90V/47Hz	90.2	0.64	90.7	0.77
90V/50Hz	90.2	0.63	90.7	0.76
90V/60Hz	90.3	0.63	90.8	0.74
100V/60Hz	91.0	0.62	91.4	0.73
115V/60Hz	91.3	0.6	91.7	0.68

The conduction loses of the bulk capacitor and of the front end became small at higher input AC voltage and the gains from the chopped DC link method are negligible. For operation well above 115Vac the chopper switch has been maintained ON all the time. Hence there are no major differences between the operation of the original adapter and the modified one. There is only a 0.1% drop in efficiency at 230Vac/50Hz under full load due to the chopper switch M0 extra conduction loses. The bulk capacitor voltage ripple is already small at high line; therefore, a reduction in its capacitance value does not have a significant influence. For operation under 50% of the nominal load the conduction losses are also reduced, fact that eliminates the need for actively chopping the DC link. The chopper switch can stay permanently ON for loads under 50% of the nominal output power. The bulk capacitor voltage ripple is already small at light load; therefore, a reduction in its capacitance value does not have a significant effect.

VI. FUTURE WORK

Future work is focusing on a second version of the chopper implementation, using a ground referenced chopper switch, as presented in Fig. 10. D5 and D6 are reversed, connecting the DC stage ground.

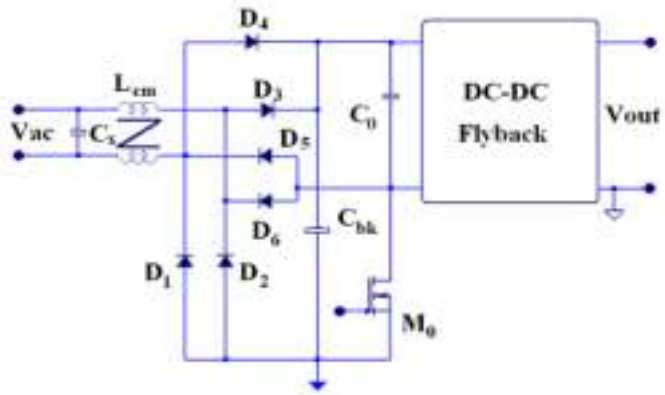

Figure 10: Ground referenced DC link chopper

This solution promises the elimination of the high- Side driver and floating bias. All other characteristics and performances of the adapter are similar with the Herein presented implementation. Other way of eliminating the high side driver s to Keep the chopper switch floating and to also float its control circuitry. In this way the low frequency switch driver can be simplified. One important future work is focusing on EMI performances of the proposed chopped DC link Flyback.

VII. CONCLUSIONS

A very close correlation between the theoretical Simulations and the experimental results has been proven. The proposed DC link chopper method brings the Predicted benefits of better efficiency, lower device Temperature and smaller footprint. The added cost and Complexity is balanced by the gain in performances, Including longer life expectancy for the resulting Adapter. The low profile adapters can benefit directly from the presented bulk cap reduction method, which brings better efficiency and thermal performance at the most critical working conditions.

ACKNOWLEDGMENT

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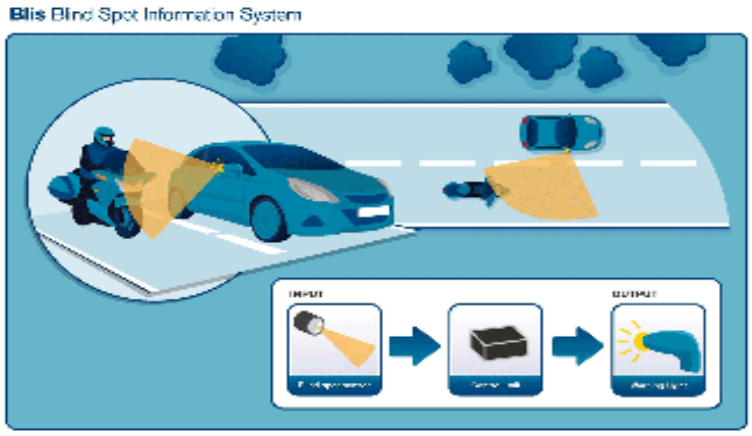
3.TOP TEN AUTOMOTIVE TECHNOLOGY OF THE YEAR

APPLE CAR AND ANDROID AUTO

Apple CarPlay and Android Auto allow a simplified version of your smartphone screen to appear on your car's dashboard display. The in-car system must be equipped with Apple CarPlay or Android Auto, and the good news is that functionality is migrating down to all but the base trim level in newest vehicles.

Interesting Facts!

- ✓ *The most advanced GPS navigation app and Apple CarPlay now work together. Enjoy 3D offline maps and other smart navigation features on your car's built-in display.*
- ✓ *Android Auto is that the apps (and navigation maps) are updated regularly to embrace new developments and data.*
- ✓ *Sygic GPS Navigation is now available on Android Auto as one of the first navigation apps, offering the benefit of offline maps.*



BLIND-SPOT WARNING

Blind spot warning (BSW) systems use cameras, radar, and/or ultrasonic sensors alongside your vehicle to detect vehicles you can't see that are next to or behind your car. If a vehicle is detected there, drivers get a visual warning, often in the outboard mirrors, or on the front pillars.

Interesting Facts!

- ✓ *small cameras in each side mirror to detect when a car or motorcycle has entered the driver's blind spot.*
- ✓ *main blind spots are located along each side of the car, slightly behind the driver, where he or she cannot see – to the back left, and to the back right of the car.*
- ✓ *This method was first revealed by George Platzer in a 1995 paper presented to the Society of Automotive Engineers*

LANE KEEPING ASSIST

Lane Keep Assist is made possible by a camera sensor that is mounted behind the windshield in front of the rear-view mirror. The camera is able to detect lane lines on the road ahead. The system operates when your vehicle is moving faster than 37 miles per hour.

Interesting Facts!

- ✓ *It may gently steer you back into your lane if you begin to drift out of it.*
- ✓ *Lane Keeping Assist system monitor the position of the vehicle with respect to the lane boundary and apply torque to the steering wheel or pressure to the brakes, when a lane departure is to occur.*
- ✓ *Lane Departure Warning (LDW): Drivers get audible and/or visual warnings whereas Lane Keeping Assist (LKA): Provides automatic steering and/or braking to keep a vehicle in its travel lane.*
- ✓ *Mitsubishi Debonair, it was the world's first Lane departure Warning system used vehicle.*

KEYLESS ENTRY AND ACCESS

Keyless entry systems are used to remotely lock, unlock and start your car's engine using RF signals. There are two types of keyless entry systems: active and passive. Active systems send a signal to the receiver in the car, and the system disarms.

Interesting Facts!

- ✓ *Keyless entry, referred to as Toyota Smart Entry by Toyota, allows drivers to enter their vehicles without the use of a key*
- ✓ *Keyless ignition system, also known by such names as Keyless start, Keyless push-button start, Intelligent key and smart key.*
- ✓ *SmartKeys was developed by Siemens in the mid-1990s and introduced by Mercedes-Benz in 1997 to replace the infrared security system introduced in 1989.*
- ✓ *Remote keyless entry systems may be able to start the vehicle and access some other functionalities.*
- ✓ *Just like any other technology, keyless entry systems can be hacked.*

CONNECTED MOBILE APPS

Connected mobile apps allow owners access to a variety of vehicle information and the ability to perform a host of vehicle-related functions via their smartphone. The specifics vary by make and model, but information can include: fuel level, battery charge level and range (in EVs), location of a parked vehicle, whether the car is locked or unlocked, and whether any windows or the sunroof is open.

Interesting Facts!

- ✓ *App-enabled functions can include remote start; scheduling service; locking, unlocking, and engine start (when combined with digital key); notification when the vehicle exceeds a certain speed or travels outside a geofenced area; and the ability to send a destination from your phone to your car's navigation system.*
- ✓ *Each brand has its own name for its app, some examples being: Lincoln Way, MyFord Mobile, AcuraLink, BMW Connected, Mercedes me, and Volvo on Call.*
- ✓ *Connected mobile apps often have a subscription fee*

Rear cross-traffic alert is often paired with blind-spot warning because they use the same cameras or radar sensors, but rear cross-traffic alert performs a different function. When backing up, it warns the driver of approaching traffic from either direction—usually with both an audible and visual warning. Some systems combine rear cross-traffic alert is automatic braking, meaning that if the driver ignores the warning, the car will brake automatically to avoid backing into the path of an oncoming vehicle.

REAR CROSS TRAFFIC ALERT

Interesting Facts!

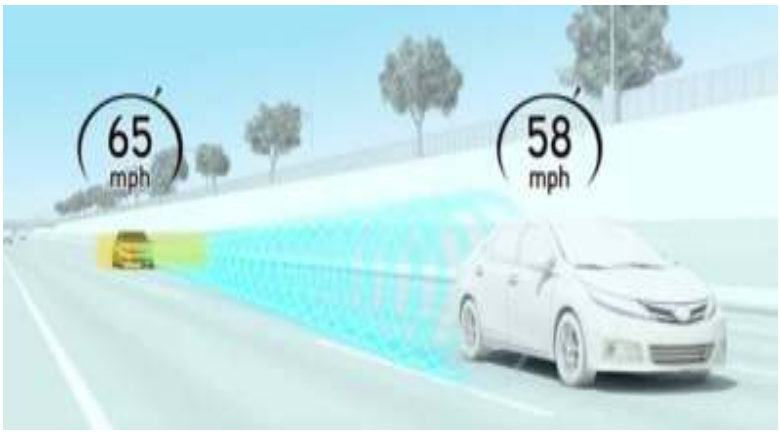
- ✓ *Sensors, which can use radar or ultrasonic waves, are located at each side of your vehicle near the rear bumper and look like buttons.*
- ✓ *Blind-spot monitoring first appeared in the Volvo S80 in 2005, and a variation of it is included on many vehicles today, with some being more advanced than others.*
- ✓ *Ford, Genesis, GMC and Honda are some of the brand which uses Rear Cross Traffic Alert.*

AUTOMATIC EMERGENCY BRAKING

When the car senses that a collision is imminent, AEB activates your car's brakes, potentially avoiding or minimizing an accident. AEB can react faster than a person and can start working before you hit the brakes. If you are braking and it senses you need to stop sooner, AEB can also brake harder than the pressure you're applying.

Interesting Facts!

- ✓ *ABS vs AEB ABS uses sensors at each wheel to determine if and how quickly each wheel is turning, autonomous braking uses sensors to detect hazards in front of the car.*
- ✓ *In the AES, Intelligent Forward Collision Warning system uses a radar sensor located behind the lower grille below the front bumper to measure the distance to a second vehicle ahead in the same lane.*
- ✓ *AEB-The Autonomous Emergency Braking (AEB) system uses forward-facing cameras to detect real vehicles, plus other certified Euro NCAP target objects.*



ADAPTIVE CRUISE CONTROL

Basic versions of adaptive cruise control, once set, can slow the vehicle below the set speed when traffic ahead slows, then return to the set speed once it clears. But it only works above 30 mph or so, and if the cars ahead drop below that speed, the system will switch itself off (with a warning to the driver).

Interesting Facts!

- ✓ *Advanced versions of adaptive cruise control include traffic assist.*
- ✓ *Adaptive cruise control can increase or decrease your car's speed to maintain a following distance that you set.*
- ✓ *Advanced versions can even slow and stop your car in traffic jams, then accelerate for you.*
- ✓ *A radar sensor is usually at the core of the adaptive cruise control (ACC). Installed at the front of the vehicle, the system permanently monitors the road ahead.*

360 CAMERA

Backup cameras are currently mandated in all new cars, but large vehicles and those with compromised visibility really benefit from more robust, 360-degree cameras. With this functionality, a series of cameras around the car send info to a central computer, which can stitch together a top-down view around the car that can be shown in a split-screen display along with the rear camera view, greatly aiding manoeuvrability in tight quarters.

Interesting Facts!

- ✓ *The surround view camera system software displays the vehicle and its surroundings so that it looks like the car is being filmed by a drone from directly above.*
- ✓ *Dash cameras are designed to record all the time when your car is powered on.*
- ✓ *Many cameras allow you to turn the power on or off manually, but most power up immediately and begin working as soon as they are plugged into a 12V power source or hardwired into the car's fuse box.*
- ✓ *The federal regulation requires that all new vehicles are required to have back up cameras and video displays.*

Depending on the features offered by the automaker, vehicle keys or key fobs can be programmed to: set a speed warning; set a speed limit; prevent the vehicle from shifting into gear if the driver seatbelt is unbuckled; prevent the audio system from turning on unless all front-seat passengers have buckled their seatbelts; set a lower maximum volume for the stereo; prevent active-safety features from being switched off; and block adult content on satellite radio.

TEEN DRIVER TECHNOLOGY

Interesting Facts!

- ✓ *Teen Driver offers several functionalities to elevate safety, starting with automatically muting the stereo or any other audio device until the driver buckles their seatbelt.*
- ✓ *ACC is ideal for stop-and-go traffic and rush hour commuting that swings from 60 mph to a standstill.*
- ✓ *With the assistance of Cruise control, a driver's speed is regulated which can help mitigate speeding and may reduce the number of accidents on the road.*
- ✓ *An ACC system may also not work properly in certain weather conditions like heavy rain or fog.*

PUZZLES ZONE

WORD PUZZLE

What is the ONE WORD which can be used to complete all these words?

D	*E*				*S*	*T*

F			

S	*H*			

S	*T*			

P				*N*	*T*

C			

PUZZLES ZONE

1-3 is a Bird,

4-7 is a suffix,

8 & 9 is an emotion,

10-14 is a film series

Guess the name of the Car Brand.

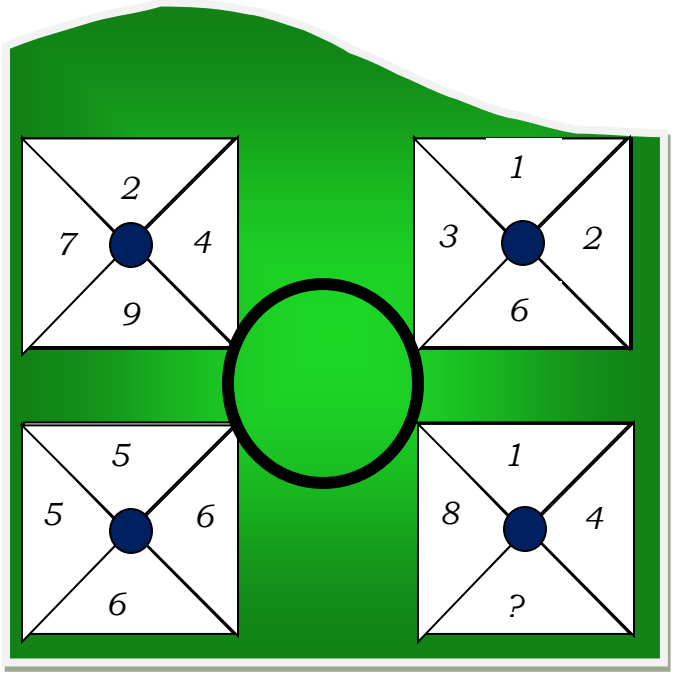
9 + 5= 9

7 + 4= 5

12 + 6= 15

Then,

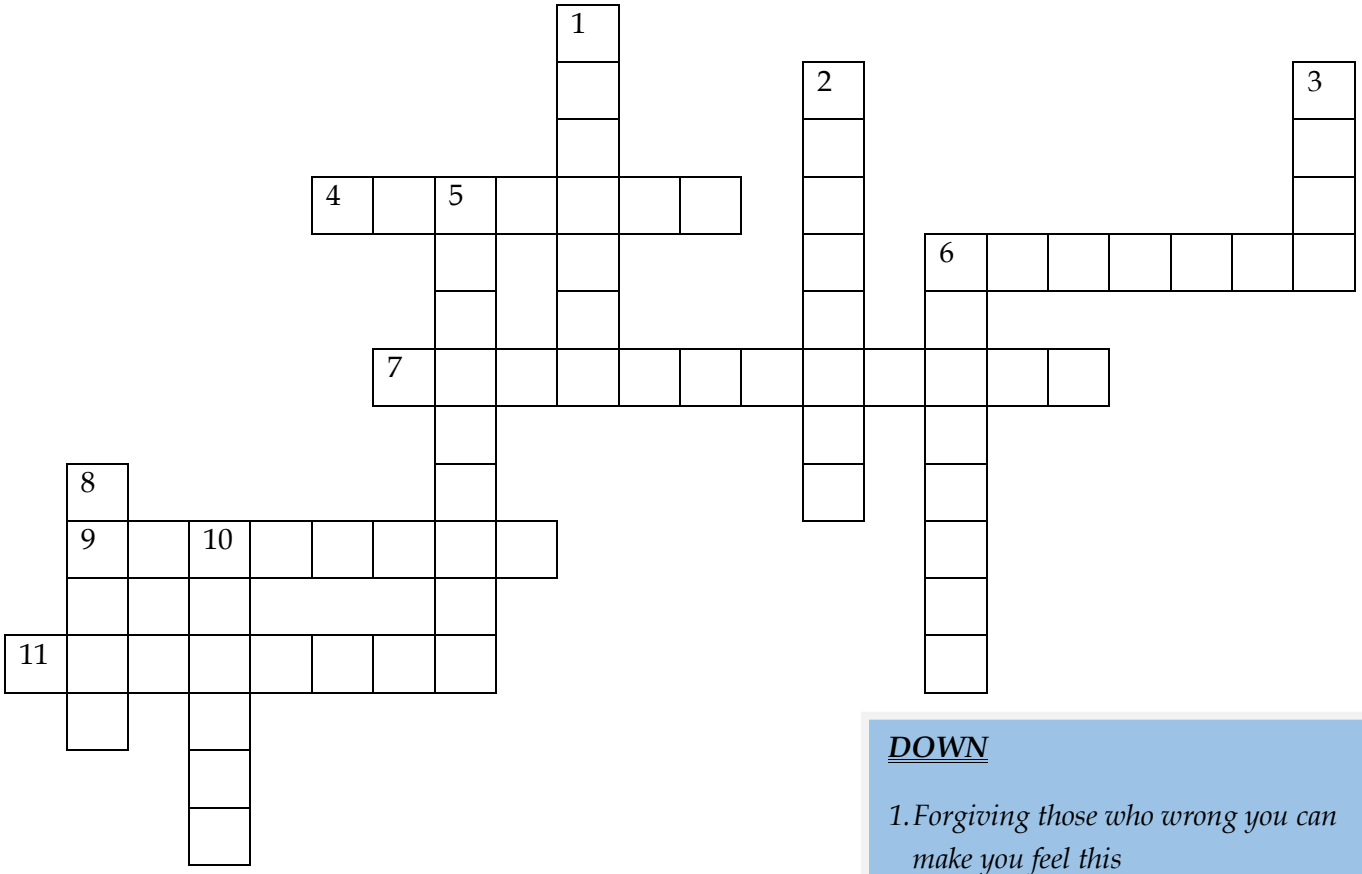
18 + 11=?



Find the missing Number?

7	3	6	2
2	8	5	4
1	1	2	4
4	2	1	?

PUZZLES ZONE



ACROSS

4. The……Syndrome of being caught up with current events rather planning ahead.

6……. this multiplies our efforts.

7.Prioritizing the big things can double this…….

9.Honesty is about being consistent in what you speak and in this……

11. One of the things we seek refuge from, in order to be productive

DOWN

1.Forgiving those who wrong you can make you feel this

2.Never leave the important things till last

3.You are born with organizing talent

5.First step of habit change……..

6. Productivity that is so much fun…….

8. Silent Coach……..

10. Set things in order…….

"Education is not the learning of facts,
but the training of
the mind to think."

- ALBERT EINSTEIN

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