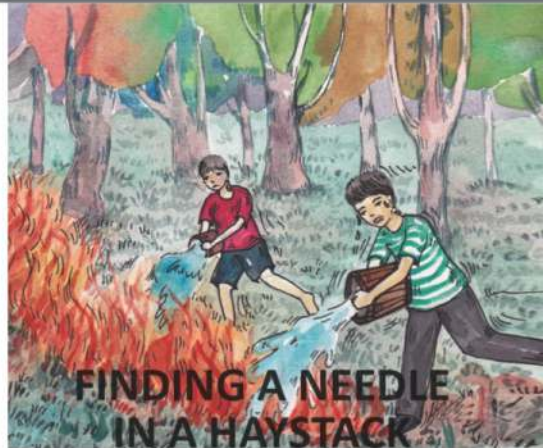


WHAT CANNOT BE CURED
MUST BE ENDURED



SERVICE IS WORSHIP

Part-1

A Content Marketing Publication
for Continuous Improvement

SMALL LEAKS
CAN SINK BIG
SHIPS



Energy Solutions (Pvt.) Limited

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ACKNOWLEDGEMENT

This book is dedicated to Mr. Junaid Shahzad, our Director Commercial and Mr. Adnan Maqbool, our GM Sales who passed away as a result of a deadly car accident on October 19, 2017. Their demise is a great loss and setback to the whole organization.

We request our readers to pray to the Almighty Allah to rest the departed souls in eternal peace and grant courage and fortitude to the bereaved families and ESL staff for this irreparable loss.

May Allah shower His blessings and mercy on the minor kids left orphan by our dear colleagues.

We also pray to the Almighty to include them in His favored servants and reward them with the highest ranks in Jannat-ul-Firdous.

Amen!



Mr. Junaid Shahzad- the Pride of ESL

Mr. Junaid Shahzad was our Director Commercial and a Director on board. He also served the organization as Company Secretary. Joining at the young age of 25 he soon started running the show holding several important portfolios and playing instrumental roles on many fronts.

Mr. Junaid was not only a gem of a person but also amazingly illustrious, industrious and versatile. He was an upright man of integrity and commitment. He inculcated a culture of philanthropy in the organization. He also played a great role in making the company operate and prosper without a recourse to the banking line.

He was endeared by whosoever he came across with even for a short period of time. He was a coach, a guide and a mentor. Even people several years senior to him in age and position used to seek his advice not only in professional matters but in personal matters too.

Though his tenure (2007 --- 2017) was only about a decade yet he made the company advance several decades ahead with his invaluable contributions.

We proudly term his period of association with us as one of the best and pray to our Almighty Allah to make good his loss.

We also sincerely pray to Allah to nourish and nurture the seeds of virtue that he sowed in his lifetime and let them be a source of divine reward for all times to come not only for him but his surviving family members and colleagues.

Mr. Junaid Shahzad- you were a beacon light for us and showed us the way whenever we were left without options. You were known for facilitating the life of everyone around you. You will always be remembered and your contribution will always serve as a great source of inspiration to all of us at ESL.

بچھڑا کچھ اس ادا سے کہ رُت ہی بدل گئی
اک شخص سارے شہر کو ویران کر گیا!

Rest in peace in gardens of Eden!

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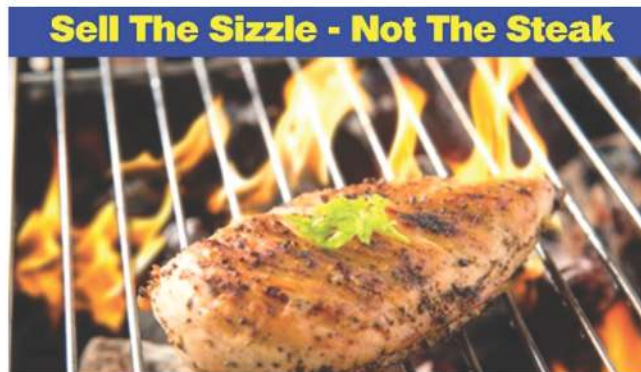


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PREFACE

A “CONTINUOUS IMPROVEMENT” EXERCISE BY ENERGY SOLUTIONS LIMITED

Energy Solutions Limited (ESL) is attempting a continuous improvement exercise in a modest and humble way. This book is hopefully just the beginning. It tries to sell important concepts just like a master salesman sells his products. He does not sell the steak. Instead he sells the sizzle.



This booklet is not only of value to engineers, maintenance and quality professionals, business managers but others too including their loved ones. They can learn some very important concepts by associating them with lively illustrations and powerful phrases commonly used in both English and Urdu languages. It will also provide every reader an opportunity to come across some inspiring, life changing messages for personal as well as professional life. Our approach is very similar to the concept of “content marketing”. We hope the readers will anxiously wait for its future editions, too, which, hopefully, are just round the corner.



We, at ESL, offer free of cost training to our customers on the topics covered here and a lot more in our “Meet & Treat” sessions. In case of training requirements, please write directly to the authors at customer care@esl.pk. While we present this, we are fully aware of our shortcomings and deficiencies. Please do advise us to do better job as and when we decide to issue a revised version.

Compiled by:

Engr. Saima Haseeb

1. BAKER'S DOZEN – درجن کے تیرہ

Motivational speaker, Qasim Ali Shah, narrated the story of a fruit vendor selling bananas. He used to live from hand to mouth just like all other vendors selling bananas. One day he decided to make his dozen count thirteen instead of twelve. This extra banana added extra to his ordinary status also. He was transformed from an ordinary person into an extraordinary one.

The above narration also brings to our mind the medieval story of a baker. He became popular for his "baker's dozen". He always used to sell thirteen donuts instead of twelve in his pack of a dozen.



As a service providing company, we should also perform more than we promise and greater than what the customer agrees to pay and expects to receive. We should not only satisfy customers, but also delight them. Make ourselves a best-in-class company and become a benchmark for the others.

Do **احسان**! Make customers win, you will win too. Make them stay in the business, you will stay too. Remember:

"IHSAN MEANS STRIVING TO REACH THE BEST STANDARDS OF PERFORMANCE IN TERMS OF EXCELLENCE, GRACIOUSNESS AND BENEVOLENCE. WHEREAS, ADL (FAIRNESS AND JUSTICE) MEANS SATISFACTORY PERFORMANCE OF ONE'S OBLIGATIONS TO OTHERS AND FULFILLING THE RIGHTS OF OTHERS ON ONESELF. IHSAN CLEARLY MEANS DOING MORE THAN THAT WHICH A PERSON IS OBLIGATED TO DO".

WHEN YOU PERFORM IHSAN, DIVINE HAND HELPS YOU WHEN IT MATTERS MOST (ILLUSTRATED BELOW)



2. A FRIEND IN NEED IS A FRIEND INDEED – دوست وہ جو مصیبت میں کام آئے

Be it an industrial giant or a huge commercial building; a hustling, bustling container terminal; a telecom installation in a dusty, sandy terrain; banking sector or oil and gas industry or simply a domestic consumer suffering at the hands of never-ending load shedding, ESL provides you the answer (though sometimes customers miss the answer just like the boy in the picture 😊).



ESL offers a complete range of tried, tested; battle hardened diesel generators with Cummins engines, though other options are also available. These sets are ROBUST, RUGGED, AND RESILIENT and of RENTAL grade construction. That is why ESL readily offers extended warranties.

Complete back up service is also available with parts, tools, softwares for complete engine overhauls (especially for high horsepower engines). Fuel system calibration facility is also available.

ESL also synchronizes sets of any make, model, and manufacturer, mix of fuel and MAINS with complete in-house resources. It also performs seamless transfer of electricity with utility on either side of a power outage.

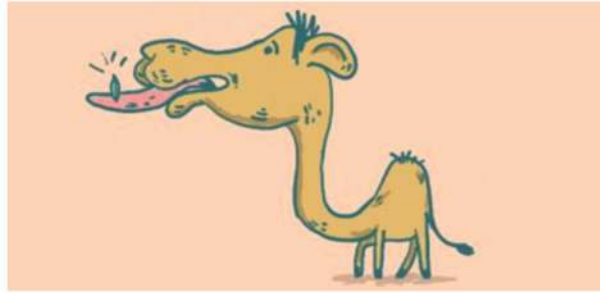
Another very important feature of ESL is performance of Maintenance Contracts on customer's engines thereby relieving them from the headache of maintaining their sets and allowing them to concentrate on their core business.

Furthermore, ESL offers Cummins gas generators from 315 kW to 2000 kW. This range includes both high torque series and high efficiency series engines.

ESL does not sell. It helps you to buy. The best help is "service par excellence". Yes! Cradle to grave service starting from your intent to buy and continuing till the end of the equipment's life cycle. Even if you don't buy from ESL, keep it in the race to prevent other suppliers from taking undue advantage. **This is the least a friend can do for you.**

3. A DROP IN THE OCEAN - اُونٹ کے منہ میں زیرہ

The authors have tried to underscore the importance of service in all aspects of life, in general, and power generation business, in particular. In doing so, they have used the techniques of content marketing. How far, they have been successful, in their endeavors, is up to the reader to decide.



Though, the authors feel, because of the vastness of the subject, their efforts are only a drop in the ocean (cumin in a camel's mouth).

In a nutshell what the authors have tried to achieve can be summarized as follows:

- ✓ Service is worship.
- ✓ What SERVICE stands for?
- ✓ Only Service wins hearts and minds of the customers and is truly a game changer.
- ✓ Selling alone doesn't help. Helping sells.
- ✓ Do what you say and vice versa.
- ✓ Fulfill all your promises with the customers.
- ✓ Perform more than you promise and that the customers agree to pay.
- ✓ Let the customers WIN - always.
- ✓ Honesty is the best policy.
- ✓ Attitude is more important than aptitude.
- ✓ Doing right things is more important than doing things right (effectiveness vs. efficiency).
- ✓ Why companies fail?
- ✓ What can be conceived can be achieved! You get what you seek.
- ✓ What makes a super salesman? For more details, read ESL Sales policy.
- ✓ Safety, quality and continuous improvement should never be compromised.
- ✓ Pareto, Six sigma, 5S, Poka Yoke! Apply these to Service!
- ✓ Battles are first won in the mind than in the battlefield.
- ✓ Evolution of maintenance service strategies.
- ✓ Importance of daily maintenance, whether the plant produces bulbs, bread, buses or simply electricity from a generator.
- ✓ Perfecting the wheel.

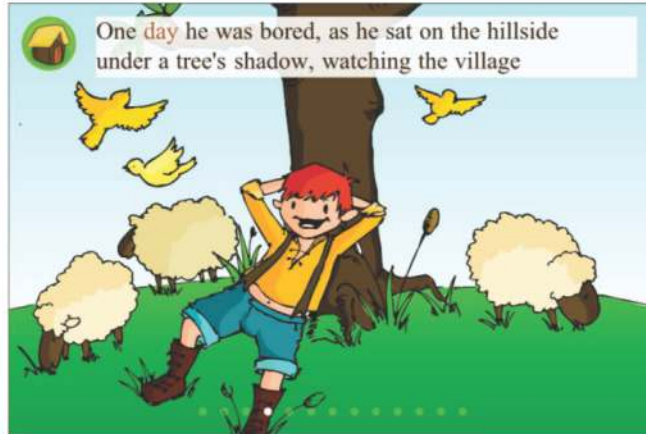
PART 1

SAFETY FIRST!

4. CRYING WOLF – قبل از مرگ واویلا

Remember the childhood story of a boy who cried wolf and ultimately got into problem. In matters pertaining to health and safety it is, however, advisable to cry wolf even if the wolf never appears.

Whenever tiniest and minutest of safety hazards is noticed, it is very important to raise alarm and cry wolf before it actually arrives.



Workers who “blow the whistle” and draw attention towards a potential safety hazard should always be encouraged, appreciated, recognized and rewarded.

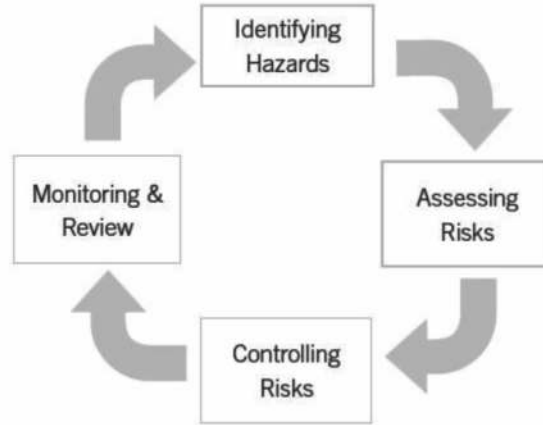


5. COME HELL OR HIGH WATER – آندھی ہو یا طوفان

Come what may!

Every organization should follow a four pronged strategy for averting accidents. It should include:

- Hazard identification
- Risk assessment
- Hierarchy of risk control
- Review



Failure to do so will expose it to serious risks and “for all intents and purposes” bring it to a brink of disaster. Please read ESL article and ask ESL for a full presentation on this subject:



خطرات سے نبرد آزما ہونے کے لئے حفاظتی اقدامات اور ان کی حکمت عملی

ہر کام کو شروع کرنے سے قبل خطرات کا پیشگی اندازہ لگائیے اور کسی بھی ممکنہ خطرے (Potential Hazard) کو محسوس کرنے کی صورت میں اپنے سپروائزر یا دیگر ذمے دار افراد کو مطلع کیجیے۔ خطرات سے نبرد آزما ہونے کی حکمت عملی مندرجہ ذیل اقدامات پر مشتمل ہے۔

- ۱۔ خطرات کی نشان دہی اور ان کی موجودگی کا فہم (Hazard Identification)۔
 - ۲۔ خطرات کا تجزیہ (Risk Assessment) یعنی خطرے کی گتینی اور ممکنہ حادثے کی گنجائش اور نقصان کی حد کا تعین۔
 - ۳۔ احتیاطی اقدامات اور ان کی درجہ بندی (Hierarchy of Risk Control)۔ یہ چھ امور پر مشتمل ہوتی ہے جو مندرجہ ذیل ہیں۔
 - ☆ اخراج (Elimination) یعنی خطرے کی جڑ کو یکسر ختم کر دینا۔
 - ☆ تبدیلی (Substitution) یعنی زیادہ خطرے والے کام کو کم خطرے والے کام سے تبدیل کرنا۔ مثال کے طور پر بلند خطرناک مقام تک جزیئر کو کھول کر چو پائے پر لا کر پہنچانا۔
 - ☆ الگ کرنے کا عمل (Isolation)۔
 - ☆ انجینئرنگ تدابیر (Engineering Controls) مثلاً، گاڑی چلاتے وقت سیٹ بیلٹ کا استعمال۔
 - ☆ انتظامی تدابیر کا استعمال (Administrative Controls) جیسے ہیڈلٹ کے عدم استعمال پر چالان۔
 - ☆ ذاتی حفاظتی سامان کا استعمال (Personal Protective Equipment)۔
- مندرجہ بالا اقدامات میں سے ہر عمل ترتیب وار نہ صرف یکپہلے (Preceding) اقدام کے استعمال نہ ہونے کی صورت میں قابل عمل ہوگا۔
- ۴۔ حفاظتی اقدامات پر نظر ثانی (Review)۔

6. BETTER SAFE THAN SORRY – حفاظت افسوس سے بہتر ہے

Extreme care should be exercised before commencing work on the generator and while executing it. Read our article available on ESL website to make sure that proper "Lock out, Tag out" procedures are fully implemented.

Safety Considerations While Handling Generators

◆ Safety Considerations

A. General Hazards

1. Installation, repair and maintenance should always be in accordance with the manufacturers instructions and recommendations.
2. Exhaust fumes emitted by generator sets contain poisonous gases like carbon monoxide that can be life threatening and result in death. Exhaust systems must be properly installed, adequate ventilation must be provided to ensure unobstructed flow of cooling and ventilating air, and emissions must be directed away from inhabited zones.
3. The area around the generator must be clean and free of clutter and any combustible material that can be hazardous.
4. The equipment must be regularly inspected and defective or damaged parts must be replaced in a timely manner.
5. It is essential that the operating personnel remains alert at all times while working with the generator.
6. The unit should not be opened or dismantled while it is functioning. Moving or hot parts should not be tampered with. Battery cables should be disconnected before proceeding to work on the generator to eliminate any possibility of an accidental start-up.

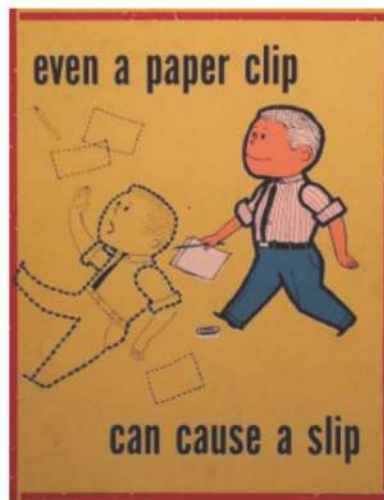
B. Electrical Hazards

1. All power voltage supplies should be turned off at the source while installing or servicing the generator.
2. All electrical connections, such as wires, cables and terminals must be properly insulated and covered, and should not be touched with bare hands or while in contact with water. This is essential to prevent the occurrence of an electric shock.
3. The frame of the generator and any external conducting parts should have proper grounding / earthing wiring. This should never be disconnected.
4. Wiring, cable and cord sets must be of the recommended capacity.

C. Fire and Explosion Hazards

1. Smoking in the vicinity of the equipment can be fatal.
2. Fuel or oil spills around the generator, leakages from the units fuel system and fuel supply lines, and presence of combustible materials around the generator will pose a risk of an explosion.
3. A fire extinguisher should be readily available. Use of extinguishers that operate on carbon tetra-chloride is strictly prohibited since the fumes are toxic and can deteriorate the insulation on the wiring of generators.

Please embed it in your mind that even a paper clip can cause a slip.



It is better to be safe than sorry. Etch it in your mind; put it under your skin; get it flowing in your blood.

Please contact ESL for its "Health, Safety, Security and Environment Booklet". Also view, ESL publications on safety in the customer care section of its website.

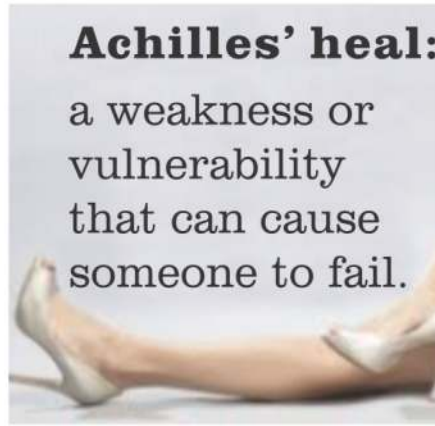
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PART 2

QUALITY SECOND TO NONE!

7. ACHILLES' HEEL OF MANY ORGANIZATIONS – دھتی رگ

Most organizations fail because of quality of service. The quality of service separates good from bad, ordinary from extraordinary. Please don't compromise on your service quality. It will make you slip, trip and ultimately rip apart.



8. DON'T BITE THE HAND THAT FEEDS YOU – جس تھالی میں کھائیں اُس میں چھید نہ کریں

Kill not the goose that lays golden eggs. By the same token, don't cut the branch supporting you.



Treat your customers, whether internal or external, well. Don't take them for granted. Don't betray their trust by unnecessarily doing more than what is required on their equipment. Never take advantage in terms of high price and / or low quality. Remember a satisfied customer is an annuity forever. They will continue to look after your families. Make them win, you will win too.



9. NO USE CRYING OVER SPILLED MILK - پچھتاوے کیا ہوو ت جب چڑیاں چگ گئیں کھیت



Generators are lifeline of any industry, banks, telecommunication operators, commercial outfits, hospitals, etc. Poor Service is neither forgotten nor forgiven. It drives away the customers for ever. Regrets and repentance thereafter is of no avail. It is no use crying over spilt milk. Remember poor customer service is the biggest reason of customers quitting you.

Why customer quit existing company

- Customer might die 1%
- Relocate 3%
- Develop other friendship 5%
- Dissatisfied with product 14%
- Dissatisfied with present company on the ground of customer service 68%
- Customers are brand loyal 9%

10. ROME WAS NOT BUILT IN A DAY - ہتھیلی پر سرسوں نہیں جمتی

SERVICE at ESL stands for **S**afe, **E**mpathetic, **R**esponsive, **V**irtuous, **I**nnovative, **C**ompliant and **E**ffective. It has a lot to do with attitude and ability. Acquiring the right skill sets (ability) and developing the perfect service attitude may take ages and massive continuous improvement efforts.

S	Safe	Safety first
E	Empathetic	Putting your feet in customers' shoes and feeling their pain
R	Responsive	Performance which responds to customers' needs with speed and excellence
V	Virtuous	Performance which is conscientiously, morally and ethically right
I	Innovative	Performance different than the others
C	Compliant	Performance meeting with community, country and customers' requirement
E	Effective	Performing the right things, efficiently, timely, consistently and cost effectively

11. MOTHER OF ALL EVILS! تمام بُرائیوں کی جڑ



16,000 gallons! Yes! Indeed! 16,000 gallons of water!

A typical heavy duty cooling system will circulate a 16,000 gallon swimming pool worth of coolant every hour.

The general function of coolant is simple, to transfer heat from the engine. This is done by removing heat from engine components, circulating the heat through the cooling system and dissipating the heat through the radiator. The thermostat allows the cooling system to control the temperature of the system.

However as simple as this sounds, coolant technology and maintenance is extremely important to the function of the engine.

The generator cooling system, in Pakistan, is the mother of all evils because of very high temperatures in summer.

A coolant must protect the whole system in order to properly remove heat from the engine. The coolant interfaces with many metallic and non-metallic surfaces and is also used to manage the temperature of other engine fluids.

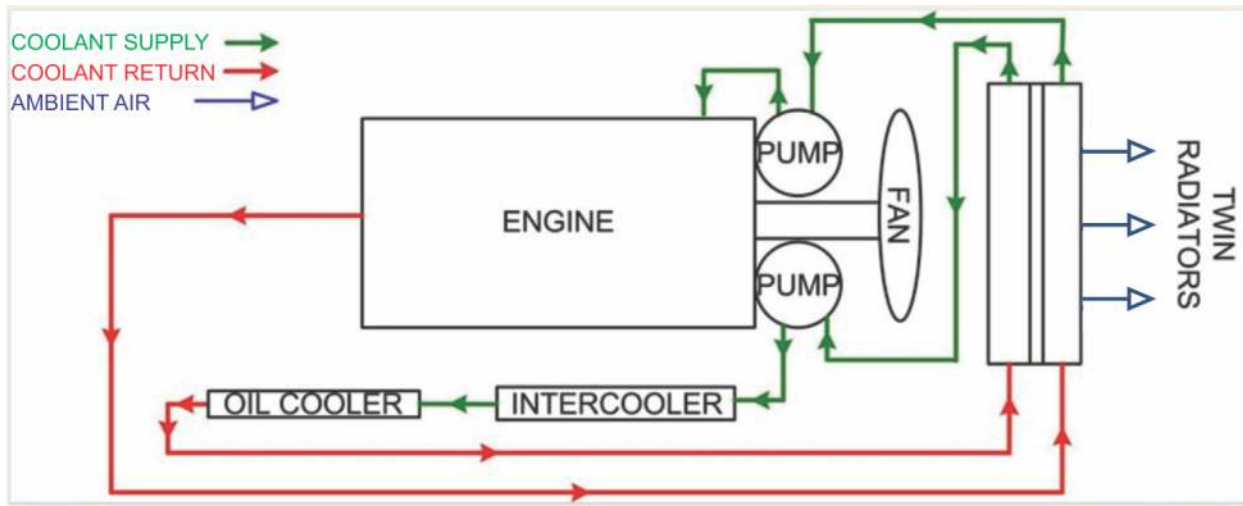
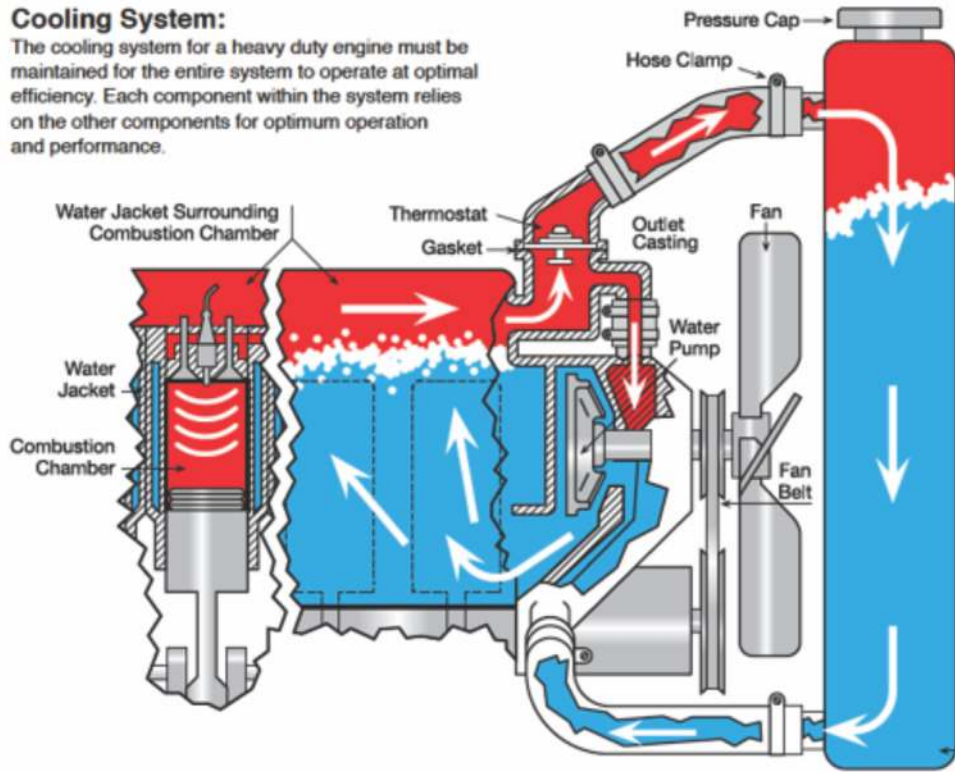
To properly transfer heat, the coolant must protect the system components from corrosion, cavitation and scale.

More than 40% of engine problems originate in the cooling system. This makes selecting and maintaining your coolant key to protecting and ensuring the longevity of your equipment.

Aksa generators with truly 50 degree radiators provide a very good solution to the customers.

Cooling System:

The cooling system for a heavy duty engine must be maintained for the entire system to operate at optimal efficiency. Each component within the system relies on the other components for optimum operation and performance.



12. WHEN THE SKY WILL FALL, WE SHALL CATCH THE LARKS - نہ نومن تیل ہوگا نہ رادھا ناچے گی

The amount of oil that Radha needs, proverbially, to perform her dance is incidentally the same as required by a one megawatt gas generator. Whether she dances or not, is not important for an engineer. Important is that the engine will not work if not properly lubricated. In fact, it will seize.

Make no compromise on lubrication. It is the key to long life and good performance. See more details in our article "Ten commandments of maintenance". This topic is also covered in our "Meet & Treat" sessions.

Lubrication = $\frac{1}{2}$ Proper ☒ Maintenance

LUBRICATION SYSTEM OF AN ENGINE

The movement of various engine parts under high speed and high load conditions (measured by BMEP) creates the requirement for an engine lubrication system.

Without some lubricant, friction between parts would quickly wear and generate heat causing severe engine damage and eventually seizure.

A number of other lubrication system functions, while not obvious, are critical to good engine operation and durability. Lubrication system in an engine accomplishes the following tasks:

1. Reduces friction between moving parts, which minimizes engine wear, and the creation of heat.
2. Cools a variety of internal engine parts and removes some heat from the engine.
3. Removes dirt, abrasives and contaminants from inside the engine.
4. Assists sealing of the combustion chamber by forming a film between the piston rings and the cylinder wall.
5. Absorbs shock loads between bearings and gears thus cushioning and protecting engine parts while minimizing engine noise production.
6. Stores an adequate supply of oil for lubricating internal engine parts.
7. Minimizes corrosion of internal engine components.

13.A PEBBLE IN THE SHOE – ذرا ساکنکر، چلنا دو بھر

Boxer Muhammad Ali once said, "It isn't the mountains ahead to climb that wear you out but it's the **pebble** in your **shoe**."

Would you believe, a lot of generator failures occur not because some component has broken down; they occur because of there being no fuel in the tank or fuel quality being poor. Fuel often becomes a pebble in the shoe.

Fuel problem solved!



Fuel is the fodder for the generator. Solution to fuel problems is not found as shown above. A lot of customer complaints are addressed simply by refueling or using better quality fuel or adding a water separator in the fuel line or simply cleaning of the fuel tank. The customers should also ensure regular calibration of engine pumps and injectors, which can easily save 3-4% on fuel consumption.

This is all the more important because fuel cost in Pakistan is more than 80% of total cost of generating electricity from a diesel generator. Yet customers become complacent and have to cut a sorry figure. Theft of fuel, in many cases, adds insult to the injury.

Importance of fuel system and its calibration is covered in our "Meet & Treat" sessions.

Fuel pump and injector calibration facility is available at ESL for Cummins as well as non-Cummins engines.



14. THORN IN THE FLESH- روگِ جان

Root cause of most generators' problems is lack of attention to daily maintenance and the fact that it is entrusted in the hands of untrained or poorly trained people. It is really a thorn in the flesh. For details, see our article:

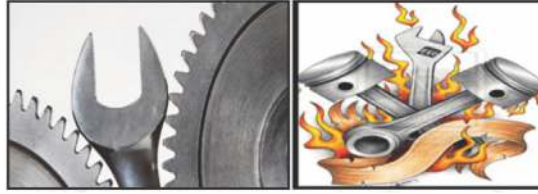
روزمرہ دیکھ بھال میں غفلت۔ زنجیر کی کمزور ترین کڑی

Battery maintenance is also a constant pain in the neck. A very large percentage of generator failures is caused by as insignificant a thing as a poorly maintained battery. Alas!

اُف



15.A SPANNER IN THE WHEELS - کام ٹھپ



It is seen that often security guards, peons, gardeners, etc., are entrusted with the job of looking after generators. This is very common in banking sector, telecommunication sites, etc. They often lack training and knowledge of the machine. Very expensive equipment is simply left at the mercy of untrained person just to save some Rupees.

Please note that an untrained operator is dangerous. He can mess up with basic maintenance and throw spanners in the wheels. Customer's production, banking operations, telecommunication coverage worth hundreds of thousands Rupees can be disrupted. If you want training for your staff, please ask ESL. It will deliver it at your doorstep free of cost as part of its obligation towards the society.

16.A PITCHER THAT GOES TO THE WELL OFTEN, WILL BREAK AT LAST –

بکرے کی ماں کب تک خیر منائے گی

Whether you have internal customers or external ones; whether you are in Sales, Service or a behind the scene officer; whether you are the CEO or a counter clerk, neglecting customer service will become a menace. It will ultimately destroy your own career as well as the name and image of the whole organization.

Please don't compromise on quality, training, relationship building, ethics and fair practices etc. Negligence of these can play havoc with your own personal career and the future of the entire organization too. The pitcher will break at last.



17.WHEELS WITHIN WHEELS – پیچ در پیچ معاملہ

Customer Service is not complex. There are no wheels within wheel. Just follow a few simple instructions:

Always stay in touch and reach out to the customers before they complain; make no false promises; fulfill your commitments; add more value than they pay; make them win; accept your mistakes while you ignore theirs continuously improve skill-sets and most importantly your mind-sets to do more with less and earlier than they expect, etc. All your worries will dissipate in thin air. Your organization will start firing on all cylinders and you will start winning too.

This will require continuous improvement at all levels, from peon to the President, which is the objective of this book. This is easier said than done. Yet there are no wheels within wheels.

18. A STITCH IN TIME SAVES NINE – وقت کا ایک ٹانکہ بے وقت کے نو ٹانکوں سے بہتر ہے

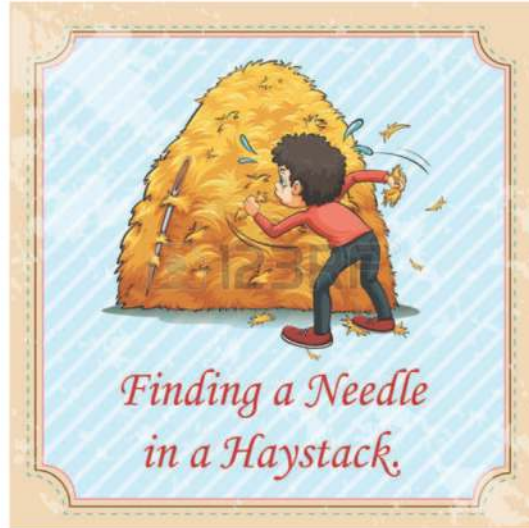
JAPANESE PHILOSOPHY – A NAIL WHICH IS STICKING UP MUST BE IMMEDIATELY HAMMERED DOWN.

Always remain in touch with your customers. Reach out to them before they complain. Resolve their issues before they become a monster. Great fires always start from a little spark. Remember an ounce of care and caution can prevent tons of catastrophe. Please nip the evil in the bud.



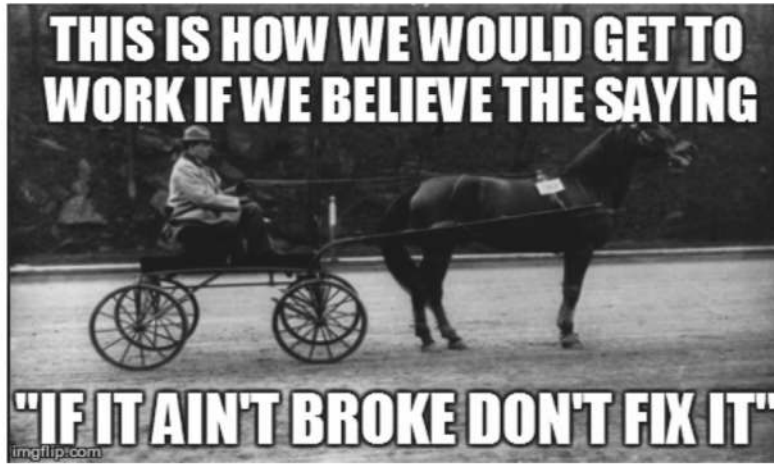
19. LOOK FOR A NEEDLE IN A HAYSTACK! بھوسے میں کیل کی تلاش

Nip the evil in the bud and remove the problem as soon as it shows up. Not doing so will result in spreading the problem all over. Efforts to correct then will be as difficult as looking for a needle in a haystack.



20. IF IT AIN'T BROKE, DON'T FIX IT! ابھی چلنے دو

This is run-to-fail maintenance strategy, which is seldom acceptable. It should not be allowed. Generally, maintenance should be performed before equipment breaks down. It costs the least and consumes the least amount of time as well. However, there are few exceptions where you see the "Don't trouble trouble until trouble troubles you" approach. Please guess!



21. THE SQUEAKY WHEEL GETS THE GREASE - بن روئے رے؟



Squeaky wheel strategy is also not nice. Instead what should be done is that the machine should be maintained as per manufacturers' recommendations. Alternatively, the condition should be watched continuously and as soon as an initial sign of a failure is discovered, the machine condition should be rectified. The maintenance must be performed before it can lead to expensive breakdowns.

22. A NEW BROOM SWEEPS CLEAN - نیا نو کر شیر مارے

Unlike a new broom which proverbially cleans only when it is new, any machine will continue to deliver first class performance provided it is maintained well and operated as per instructions of the manufacturers.

Just pay attention to daily maintenance, regular cleaning, oil and filter changes at prescribed intervals, right type of engine coolant, adequate and well balanced load on all the three phases, use of genuine parts, etc. The generator will continue to deliver desired performance year after year regardless of its age. Even the old will sweep clean. It will know the corners also well.



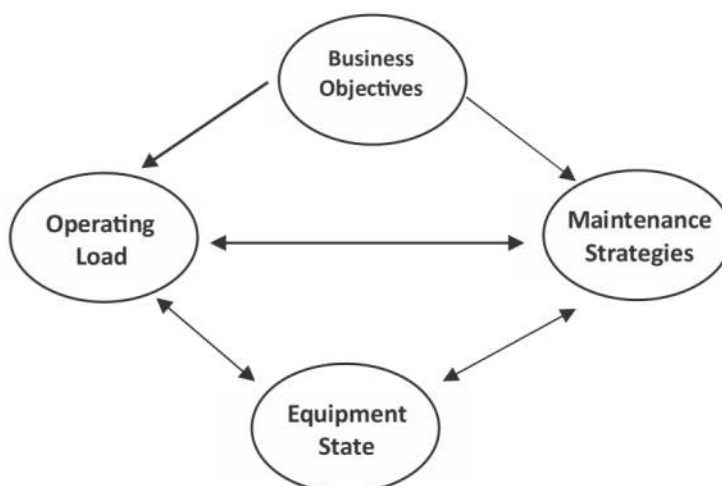
23. IN FOR A PENNY, IN FOR A POUND - جہاں سیر وہاں سوا سیر

Long ago the world has changed its perception about maintenance. Change your mindset too. Maintenance is an investment and not a necessary evil. While you invest a fortune on buying expensive equipment, you should not stop short on maintenance. Go the whole hog. In for a penny, in for a pound.

Evolution of Maintenance Management

Prior to 1950	: Necessary evil
1950-1970	: Preventive maintenance
1970s	: Life cycle costing, RCM and Productive maintenance
1980s	: TPM and RCM
1990 to date	: Strategic view of maintenance

Now the strategic view of maintenance is gaining popularity. This is defined by condition of the equipment, operating loads, maintenance action (strategies) and business objectives, etc.



Please carry out maintenance as per the strategic view maximizing uptime and reducing expenses.



24. PAY BACK IN THE SAME COIN - جیسے کو تیسے

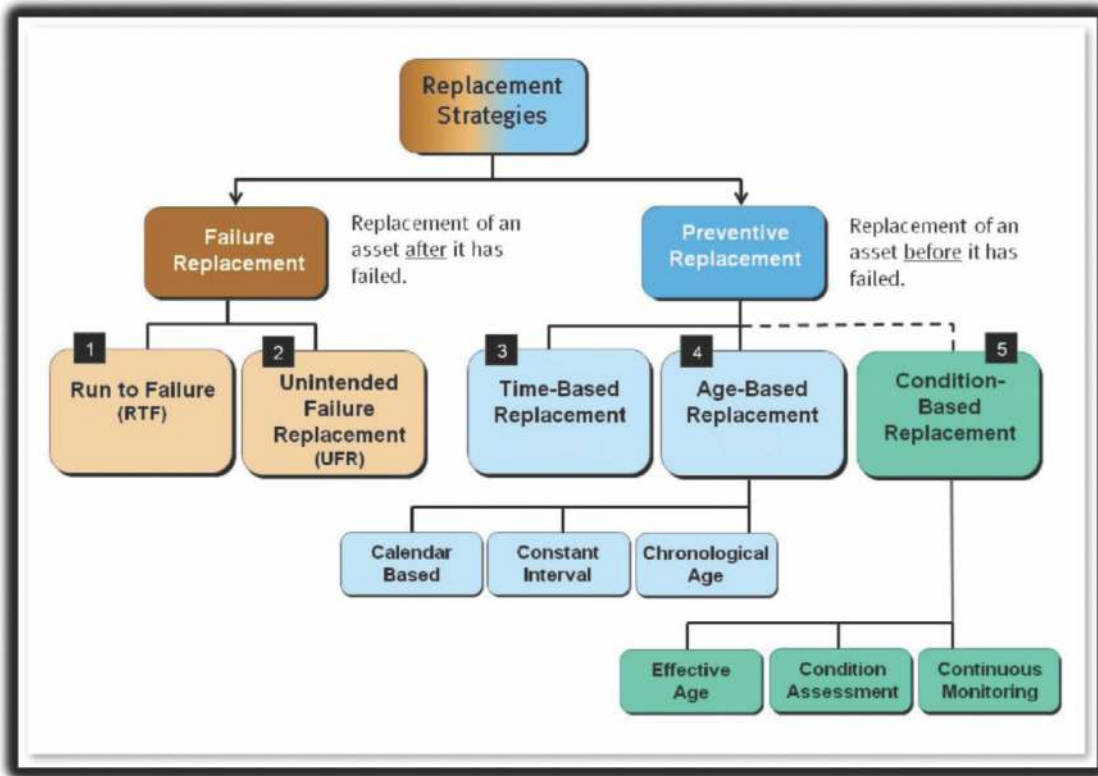
The machine always pays you back in the same coin. You look after it well, it will look after you well and vice versa. Maintenance strategy is the key!

The best maintenance strategy for your machines is reliability centered maintenance. It is a mix of run to failure maintenance (waiting for failure to occur), lots of preventive maintenance (including time based, age based, condition based) and predictive maintenance.

For generators:

1. Time based maintenance applies to Unlimited prime sets @ 250 hours, 1000 hours, 2000 hours, 6000 hours and 12,000 hours, etc.
2. Age based applies to Standby sets @ 6 months, year, two year, etc.
3. Condition based – as and when the condition dictates.

Please contact ESL for a full presentation on “Reliability Centered Maintenance”.

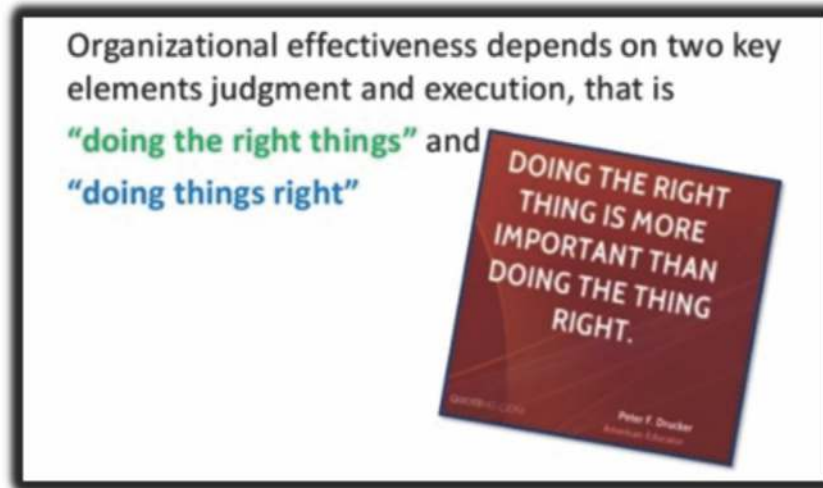


25. STRIKE WHEN THE IRON IS HOT – جب لو ہا گرم ہو۔۔۔۔۔

MATCHING MAINTENANCE WITH MACHINE!

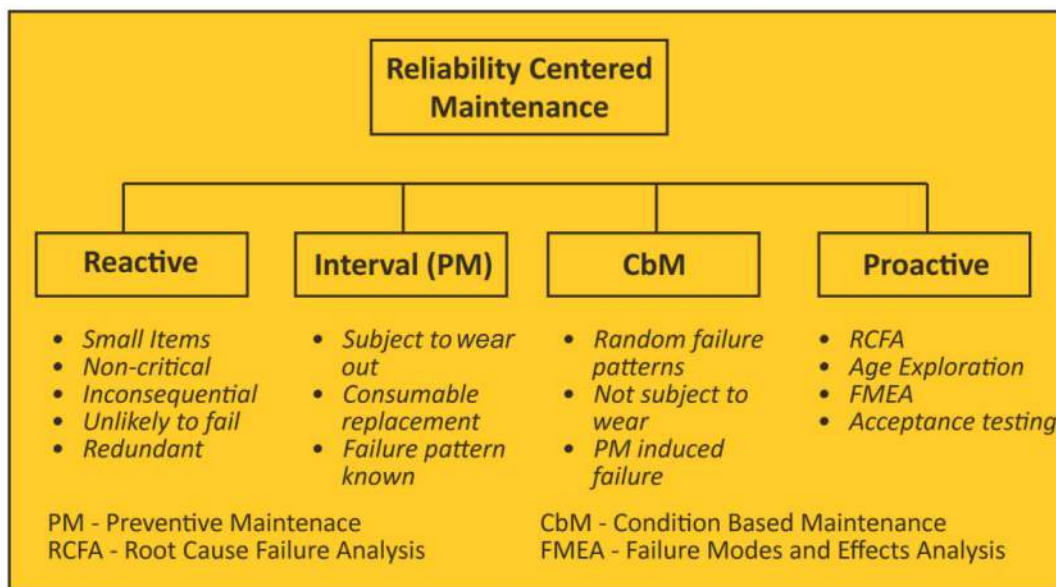


Striking iron at the right time when it is hot is being effective. Striking it with right force and at the right place is efficiency. According to Peter Drucker, effectiveness is more important than efficiency.



Let us now see which is the most effective maintenance strategy and when? Here are few examples:

- Reactive or Run to fail strategy is followed for electronic cards, control modules; heavy duty mechanical parts e.g. crank shaft, cam shaft, etc.
- Interval based Preventive maintenance strategy:
 - Time based: For standby generators
 - Utility based: For prime generators
- Condition based strategy is generally followed for fuel system calibrations; engine overhauls, etc.
- Proactive or Predictive maintenance strategy involves profiling and diagnostics to predict impending failures. It is followed for very large, heavy duty machines and its parts, etc.
- Reliability centered maintenance is the most effective form of maintenance. It is a mix of all of the above in varying proportions depending upon equipment and its operations cost, crucial nature and complexity, business objectives, etc.



26. COMING EVENTS CAST THEIR SHADOWS BEFOREHAND - پُت کے پاؤں پالنے میں نظر آ جاتے ہیں

Before an engine overhaul becomes mandatory, it shows the following signs:

1	Increased oil consumption
2	Increased fuel consumption
3	Increased blow by
4	Presence of wear metal particles in oil analysis
5	Exhaust smoke color changes to black, blue or white
6	Increased engine vibration
7	Increased noise

These symptoms are a “tip of an iceberg”. The little signs that you can see are in fact part of a much larger problem.



For more details please read ESL article “Engine Overhauls – the curtain rises”.

27. ENGINE OVERHAUL

NEW LEASE OF LIFE – نیا جیون

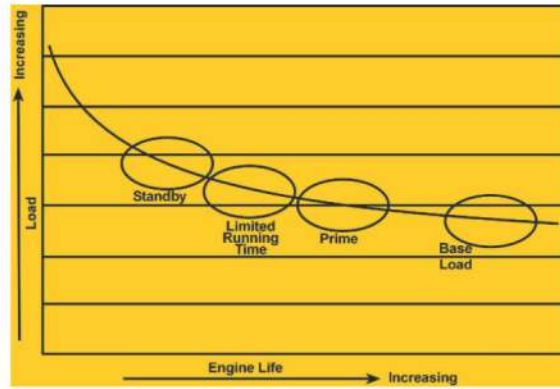


When will my engine receive a new lease of life? When will it go for an overhaul? Is there a Relationship between Overhaul Intervals and Generator ratings?

How much will it last after an overhaul? What tests should it go through before it is certified “born again” or “fit again”?

Generator set life depends upon engine load factors, fuel and lube oil quality, ambient conditions, operating load, installation quality, and the maintenance program.

Generator overhaul also depends upon whether the engine is compression ignited or spark ignited; what is the compression ratio; break mean effective pressure, etc. Please note that spark ignited engines usually go for overhaul after substantially longer time than compression ignited engines.



ESL sheds light on these in its training book, various articles, and "Meet & Treat" sessions. It is also your perfect choice for overhauls on Cummins and Perkins engines (especially high horsepower machines).

28. TAKE THE BULL BY THE HORN- مشکلات کے ساتھ، دودو ہاتھ

To do the job right, one must follow a step by step procedure. Allow no short cuts. Do what you say and say what you do. This is the spirit of ISO certification also.

Nothing gets done properly without following a method. An engine overhaul can turn out to be a futile exercise if it is not performed systematically, according to the manufacturers' recommendations as per the laid down SOP. ESL prides itself in performing overhauls on Cummins diesel and gas engines. It assures that when done properly, it can revive engines' performance and life expectancy to its original values. Please go through the following article in ESL training book:


www.esl.pk.com
ایک مثالی اور ہال (A Perfect Overhaul)

ایک مثالی اور ہال (A Perfect Overhaul)

ہوٹل میریٹ (Marriott) کے بانی اپنی کتاب دی سپرٹ ٹو سرور (The Spirit to Serve) میں لکھتے ہیں: "کوالٹی ٹولز اور مینجمنٹ کی سمجھ کے بغیر میرے بہترین باورچی (Chef) تسلسل کے ساتھ ایک اچھا آٹلیٹ بھی نہیں بنا سکتے۔ چہ جائیکہ ایک اچھی اور بھرپور پانی کا انتظام کر سکیں۔"

بچپس ارب ڈالر کی بزنس ایمپائر (Business Empire) کے مالک کا کہنا ہے کہ میرے ادارے کی ذمہ داری ہے کہ ساری دنیا میں ایک جیسی مصنوعات اور سروسز فراہم کرے جو کہ نقائص سے بالکل پاک ہوں اور ان میں غلطی کا شائبہ تک نہ ہو۔ اس کے لیے ضروری ہے کہ ادارے کا ہر شخص کوالٹی کے اصولوں سے واقف ہو۔ ہر کام کے لئے خواہ وہ آٹلیٹ بنا کر پیش کرنا ہو یا جوس کے گلاس سے صاف کی توابع ہو، ادارے کے پاس اسٹینڈرڈ آپریٹنگ پروسیجرز (SOPs) موجود ہوں اور ادارے کے ہر فرد کے لئے یہ لازم ہو کہ وہ معیار کو برقرار رکھنے کے لئے ان (SOPs) پر عمل درآمد کرے، اپنی اور اپنے ساتھیوں کی کارکردگی کو ان (SOPs) کے مطابق جانچے اور انحراف کی صورت میں اصلاحی اقدام اٹھائے۔ اس پورے طریقہ کار کو کوالٹی کی اصطلاح میں منصوبہ بندی - عمل - موازنہ - ردِ عمل (Plan-Do-Check-Act) کہتے ہیں۔



29. SLOW AND STEADY WINS THE RACE - سچ کے سو میٹھا

ENGINE RUNNING IN

Years ago, after a machine was overhauled and put into operation, it was recommended to apply load in a slow and steady manner. This gave a chance to the newly assembled parts to become compatible with each other. The process is known as breaking – in or running – in.



However, nowadays, for diesel and gas engines, the time it takes to complete break-in procedures has decreased significantly from a number of days to a few hours (even none), for several reasons.

The main reason is that the factories in which the parts are produced are now capable of better machining and assembly. For example, it is easier to hold tighter tolerances now, and the average surface finish of a new part has improved. Manufacturers, decades ago, were capable of such accuracy and precision, but not with as low a unit cost or with as much ease. Therefore, the average engine made today resembles, in some technical respects, the top-end work back then. Break-in is now done at the factory, obviating end-user break-in. This is advantageous for several reasons. It is a selling point with customers who don't want to have to worry about break-in and want full performance "right at the outset". And it also aligns with the fact that compliance rates are always uncertain in the hands of end users.

But there is a growing tendency in power generation industry of not using genuine parts. Even if the parts are genuine, the tools used may not be as per manufacturer recommendations. Even if both parts and tools meet the desired criterion, people doing the overhaul may not be well trained or in right frame of mind.

Hence, it is still advisable to allow engine parts to undergo a certain running – in or breaking – in period. This will cause no harm but maximize the equipment's working lifespan. Learn more about engine running-in in our "Meet & Treat" sessions.

30. TESTING A GENERATOR?

SITTING ON THE FENCE – جائیں تو جائیں کہاں؟؟

How to test a new generator at 100% load with resistive load only. This is a hard nut to crack. If we draw full kva from the alternator, engine is over stressed by 25%. If we apply 100% kilowatts on engine,

alternator is only tested to the extent of 80%. The best thing is to test them with inductive loads where possible. For more details, ask for coverage in our "Meet & Treat" sessions.



31. PREVENTION IS BETTER THAN CURE - احتیاط علاج سے بہتر ہے

It has been proven time and again that:

- Dollars spent on breakdown maintenance are far in excess of dollars spent on preventive maintenance.
- Preventive maintenance is advantageous because:
 - engine remains fit and healthy
 - small problems are rectified before they convert into big issues.
 - life span of generator is extended.
 - engineers are better trained while performing maintenance in a planned way instead of performing maintenance in a panicky way resulting from a breakdown.
 - parts inventory can be more effectively planned.
- Preventive maintenance is safer
- Condition based preventive maintenance is even superior because instead of repairing the engine or its part, the root cause of problem is identified and then subsequently rectified.

FOR OPTIMUM OPERATION OF A GENERATOR, FOLLOWING SHOULD BE CHECKED:**Starting Battery and Charger**

Batteries are the most common cause of standby set failing to start. Battery condition should be checked using a meter and taking a sample of the electrolyte. If the battery cannot hold charge it will be replaced. Battery terminals must be kept clean and dirt free. Charger operation will be verified.

Exhaust system

With set running, inspect the entire exhaust system including the exhaust manifold, muffler / silencer and exhaust piping. Check for leaks at all connections, welds, gaskets and joints, making sure that exhaust pipes are not heating surrounding areas excessively. Any leaks should be repaired immediately.

Fuel system

With the unit running, inspect the fuel supply lines, and return lines, filters and fittings for cracks or abrasions. Make sure the lines are not rubbing against anything that could cause eventual breakage or failure. Repair any leaks and reroute the lines to eliminate wear immediately.

Engine

Monitor all fluid levels, oil pressure and coolant temperatures frequently. Most engine problems give an early warning. So look and listen for changes in engine performance, sound or appearance that may indicate that service or repair is needed. Be alert for misfires, vibration, excessive exhaust smoke, and loss of power or increase in oil or fuel consumption.

Lubrication system

In prime power applications where the engine runs continuously, the engine oil level with set shut down should be checked daily (For an accurate reading, the generator should be run and after sufficient time to warm through, shut down and allow the oil in engine's upper regions to drain back into the crankcase - about 10 minutes). The oil level on the dipstick should be at or near to the 'full' mark. If needed, top up with the same quality brand and viscosity of oil as recommended by the manufacturer for the ambient site conditions. Oil analysis is a good way to determine the state of the oil and can indicate certain potential problems.

The oil and oil filters should be changed every 250 hours / six months, depending upon application (Read "horses for courses"). Used oil and filters must be disposed of properly to avoid any environmental damage or liability.

Coolant System

The coolant level should be checked regularly and maintained at the correct level. This solution should have a balanced mixture of water, antifreeze and additives as recommended by the engine manufacturer. Also the coolant heater (if fitted) should be checked to ensure it is working correctly. The cooling fins of the radiator must be kept free of obstructions and all dirt or foreign material removed with a soft brush or cloth taking care to avoid damaging the fins. It is important to check that the radiator fan belt is not worn, cracked or lacking the correct tension.

Fuel System

Diesel fuel is subject to contamination and deterioration over time. As diesel fuel in a sub-base of a standby generator tank is rarely consumed completely, tests should be conducted at regular intervals. Water vapor accumulates and condenses in the fuel tank. It must be drained along with any sediment periodically. The tank should be kept full and topped off at all times. Tests will indicate if fuel treatment is necessary using additives that fight micro-organism growth, prevent gelling, boost fuel Cetane levels, disperse contaminants and give added lubrication. Also test results will show the gel, flash and cloud points of the fuel and so set performance will be as designed. Fuel 'polishing' can remove any water, contaminants and sediment from tank. Fuel filters should be changed every six months or earlier if required.

Air Intake Components

All piping and hoses should be inspected weekly for leaks, holes, cracks, or loose connections. Filters must be cleaned regularly and their seals checked and replaced, as determined by the site conditions and manufacturers recommendations.

Automatic Transfer Switch (ATS)

The ATS should be checked carefully on a regular basis to ensure its proper operation. It must be maintained in a clean state and any dust, dirt or other contaminants removed with a clean dry cloth, brush or vacuum. The contacts should be checked annually using thermography (an infrared ray gun or infrared camera) to ensure there are no hot spots.

32. A NINE DAYS' WONDER – چارون کی چاندنی

A lot of new, very expensive equipment is grossly neglected when it comes to maintenance. Customers not only delay maintenance but even when they decide to do it, they take recourse to non-genuine parts, untrained workforce, outdated methods, improper tools, etc. The poor machine proves to be a nine day wonder only and soon starts suffering from poor performance. اندھیری رات!

Treating your maintenance problems with non-standard parts, tools and techniques, etc., is like feeding a sick and hungry child with a rotten apple.



33. PENNY WISE POUND FOOLISH! اشرفیاں لٹیں اور کوئلوں پر مہر

Customers spend a fortune in buying very expensive machines. But when it comes to maintenance, they settle for non-genuine parts and road side mechanics to save a few pennies. Even the quality of filters is compromised. This is a clear manifestation of a penny wise, pound foolish approach. Genuine vs non-genuine parts is covered in our "Meet & Treat" sessions.



34. BUY CHEAP AND HAVE A BAD MEAT - ستاروئے بار بار مہنگاروئے ایک بار

Genuine parts are expensive but valuable. Non genuine parts are cheap but they make you weep. Buy genuine Cummins parts from ESL for your Cummins diesel and gas engines and relax.



35. OUT OF FRYING PAN INTO THE FIRE - آسماں سے گرا کھجور میں اٹکا

There are a lot of customers who take maintenance very lightly. They consider maintenance spending a cost instead of an investment. Daily maintenance is avoided. Weekly, monthly, half yearly and yearly maintenance is delayed. They don't believe in condition based maintenance either. Only when the generator starts to squeak, screech and scream, they consider doing something. Even then they take recourse to cutting corners where possible. At first they delay maintenance and finally when they do go for it they use non genuine parts. For a generator or any other machine, this amounts to an "out of the frying pan into the fire" type situation.

SNo	Criterion	Original Parts	Aftermarket Parts	Non-genuine (Will fit) parts
1.	Cost	Nearly 50-60% more expensive than aftermarket parts	Less expensive	Least expensive
2.	Quality	The OEM part should work exactly as the one you're replacing.	Quality can be less than or equal to OE parts depending on where you buy from	Quality extremely questionable. They simply sell on resemblance and massive price difference
3.	Variety	You get only one type which is the same as originally provided	More variety is available with varying prices; though some companies specialize in specific parts	Numerous types, kinds, classes and categories are abundantly available
4.	Availability	Available mainly with the distributor or its dealer often with extended lead times	Readily available at every nook and corner of the country at 80% of the shops.	The day is not far when they will be available at every nook and corner shop including pan, cigarette vendors, etc.
5.	Ease of selection	Straight forward selection with respect to parts numbers	Difficult to choose from a variety of options	Selection is mainly made simply on resemblance and price.
6.	Warranty	Often one year	Same as original parts	Warranty is no issue. Vendors often replace freely as they already have made windfall profits on their sales

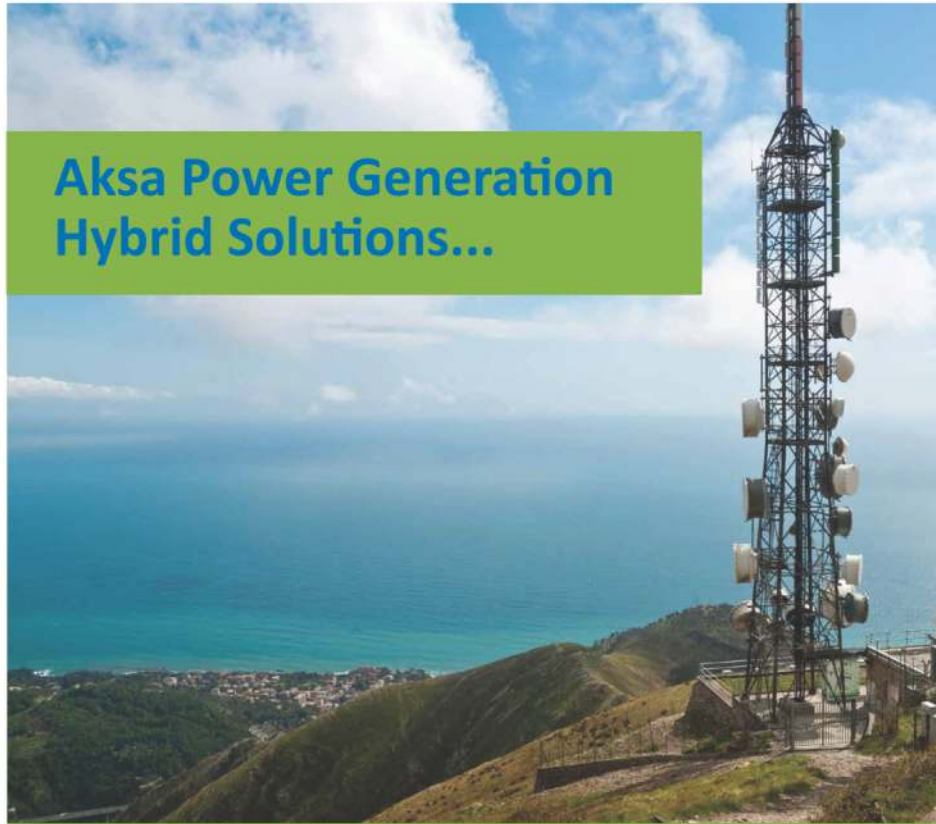
36. WHAT CANNOT BE CURED MUST BE ENDURED – قہر درویش برجان درویش

In telecom industry, BTS sites have varying load demands. There are a number of batteries which need recharging every now and then. Then there is the load of air conditioners also to keep the shelters cool. As a result the load on gensets is constantly fluctuating. The generators are often operated at less than 30% load. This results in glazing of the liners and consequently leaking of combustion gases past the piston rings into the crankcase of the engine.

Not only this, the load is also not evenly distributed on all the three phases. Furthermore, the sites are located in far flung areas and are usually unmanned. Generators do not receive maintenance for weeks, even months. Daily maintenance, which is so critical, is unimaginable. As a result these generators are often maintenance deprived. This is perhaps a necessary evil and cannot be cured; therefore has to be endured.



The best thing under these circumstances is that as and when the maintenance is performed on these generators, extreme caution should be exercised to execute all activities properly. Even better thing is to use Aksa hybrid generators, which are ideal for telecommunication sites, banks, etc.



Aksa Power Generation Hybrid Solutions...

We create different solutions for Telecom companies...

Aksa Power Generation understands the needs of the sector in the best way and offers effective solutions with special projects and custom designed products made for the telecommunication companies throughout Turkey and around World such as Hybrid Generators, custom made Silent Hybrid Generators for special events, power systems for highly populated centres. Also Aksa Power Generation has products that can be operated in remote high altitude locations with extreme climate conditions.

We produce custom tailored solutions for all kind of your needs.

We keep improving Aksa Power Generation for long lasting innovative and sustainable business cooperation around the globe. We work harder for providing the best service with our solution oriented and creative projects with the timely interventions where it's necessary.

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37. TOO MANY COOKS SPOIL THE BROTH - دولاؤں میں مرغی حرام

It is often seen in the industry that maintenance services are assigned to too many outside companies (Service providers). These service providers then assign jobs to their staff which also keeps changing. As a result, most of the times service jobs are performed by a different set of people with different skill sets, different backgrounds, varying commitment levels, unmindful of the previous history of the equipment, etc. Because of this continuous rotation of people, maintenance often becomes a joke. What should actually increase performance of the machine, ends up without adding much value.

“Too many cooks not only spoil the broth” but also refuse to own the responsibility of failure and poor performance. Every one suffers but the customers suffer the most.



38. HAVING ONE'S FEET IN SEVERAL BOATS – دو کشتیوں کا سوار

A car (or machine) which is in the hands of many is more likely to suffer from poor performance and early failure. Its example is depicted in the picture below (guess what)

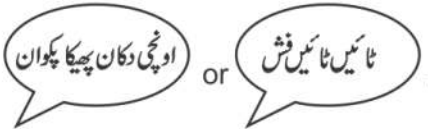


39. MUCH CRY LITTLE WOOL – اونچی دکان پھیکا پکوان

The finest machine is only as good as the quality of operation and maintenance services it receives. It is often observed that the companies exercise extreme care and caution at the design and selection stages of the equipment. Best consultants are hired; prestigious site is earmarked for plant installation; a team of expensive commissioning engineers is invited from mother factories and inauguration is performed in style. Tall claims are made. Quality rhetoric abounds.

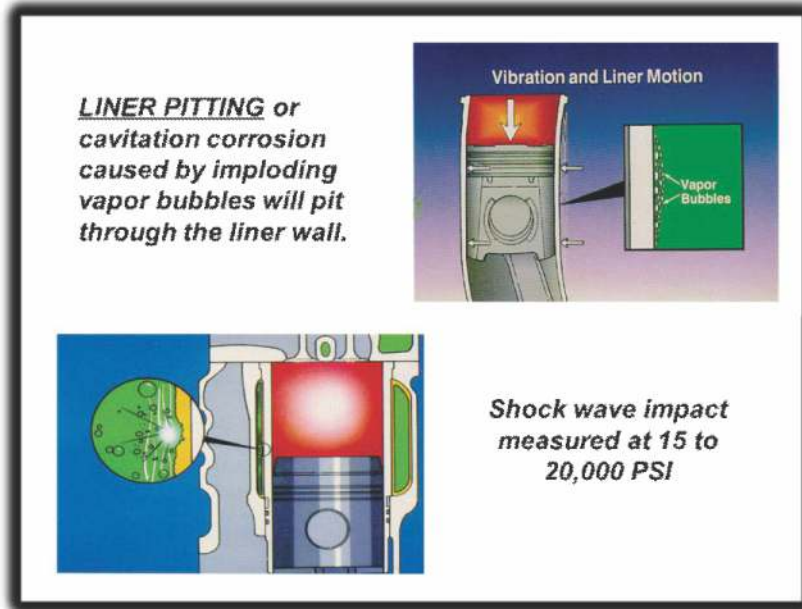
But what happens thereafter defies description. The power plant is put in the hands of untrained, unskilled lowly paid employees. Training is ignored. Maintenance is neglected. Quality of parts, even filters is compromised. Size of actions does not match the size of words. As a result the plant loses its efficiency. Performance nosedives.

It becomes a case of "MUCH CRY, LITTLE WOOL" or



40. MANY A LITTLE, MAKE A MICKLE - میل کا میل

Small negligence in Operation & Maintenance can result in catastrophic failures. Often generators fail because of dripping water hoses or leaking exhaust pipes or fuel pipes or even worse no electrolyte in the battery. Many a times, simple and small negligence of adding untreated water in the radiator can prematurely spoil your engine. Hence, small problems should never be neglected as "many a little can make a mickle". Learn more about cooling water treatment in our "Meet & Treat" sessions.



41. NIP THE EVIL IN THE BUD - گرہ کشتن روزِ اوّل

Japanese say "a nail which is sticking out must be hammered down immediately". This is true for any machine including a generator. Any leakage in oil, fuel, air induction and cooling and exhaust system can be catastrophic. Any loose nut or bolt or worn out belts can be perilous. Any abnormal temperature, noise, vibration or smoke can be menacing. Any such abnormality should be removed forthwith. This is a good engineering practice for every machine.

Nip the evil in the bud. However, its Urdu version is just a joke! 😊😊



42. A BAD CARPENTER FINDS FAULTS WITH HIS TOOLS BUT A GOOD ONE ACCEPTS HIS –

ناج نہ جانے آنگن ٹیڑھا

A bad worker is not the one who does not have the required skills. Often he is the most trained one. Yet because of poor attitude and little success which easily travels to his head, he always finds faults with his tools, colleagues, company and customers.

On the other hand, a good workman is endowed with tremendous attitude. He makes no excuses for poor performance. In fact, he does not believe in sloppy, clumsy work and uses his intelligence to overcome all the problems. Instead of moaning and groaning, he makes things happen while others around him wonder what has happened.

He gets going when the going gets tough. This is the hallmark of a good worker and ESL has plenty of them.

Contrary to the bad workman who never accepts his mistakes and finds fault with everyone, we expect every ESL worker including its top management to accept mistake, if they commit one.



43. READY, STEADY, GO – ایک، دو، تین۔۔۔

GENERATOR EXERCISING!

It is common knowledge: We all need exercise to stay healthy. But did you know your generator needs regular exercise too? Exercising your generator by running it on a regular basis – even when you don't need it – helps prolong engine life and can also enable you to identify and even diagnose little problems before they have a chance to grow into major headaches. Even short periods of time without use can result in fuel-related problems and allow moisture to build up in generator components.



Here's how to exercise your generator and keep it ready, steady & go:

- First, make sure your generator's intake and exhaust are clear.
- Next, connect your generator so it has at least a 50 percent load. Turning it on without having it power anything is only partially helpful, because it doesn't allow you to identify any issues that might occur once power is actually being drawn from the unit. Plus, your generator was designed to work with an electrical load being drawn. Operating it without that load doesn't enable it to work quite as effectively so you won't get the full benefits. Your generator manual will tell you what the unit's maximum load is; aim for at least about half of that during exercise.
- Make sure the generator has fuel and check connections as you normally would before starting it. Then, power it up and let it run for at least two hours. A two-hour period allows the unit to lubricate itself and also ensures any moisture will be completely burned off. While it's running, listen for any unusual sounds or check for other issues that could indicate a potential problem. And that's it. Simple, right?

Your generator was built to work, and allowing it to remain unused for long periods can result in its operating less efficiently or even refusing to work at all. Exercising your generator (say once a month) is a simple way to make sure it continues to work its best.

44. LITTLE STROKES FELL MIGHTY OAKS— پھول کی پتی سے کٹ سکتا ہے ہیرے کا جگر



Continuously train your people. Training contents of diesel and gas generators are available on ESL training book as well as its numerous power point presentations. "Meet & Treat" sessions are also conducted for customers.

Even little strokes of continuous improvements will cut large oaks of ignorance, incompetence, inefficiency and ineffectiveness. Ordinary workers will be transformed into extraordinary employees. Poor attitudes will give way to positivity. Craftsmanship will take place of clumsiness. Mountains of ignorance will be turned into highlands of knowledge. Quality will emerge from quagmire of wasteful working and disgruntled customers will become "customers for life". Remember quality "isn't expensive". It "is priceless".

High cost of poor quality

Facts to consider when counting the high cost of poor quality are:

- What is the poor quality costing you?
- Waste is the opposite of quality.
- The tangible costs of poor quality include rework, accidents, missed schedules, unused labor, liability and insurance and scrapped materials.
- The intangible costs of poor quality include lost customers, "never-had" customers who went elsewhere because of what they heard from unhappy customers, and poor morale among employees and stakeholders.

45. RAIN OR SHINE - بارش ہو یا برسات

Allow the generator cooling system take away all the heat after you stop the engine. Make no compromise on this!

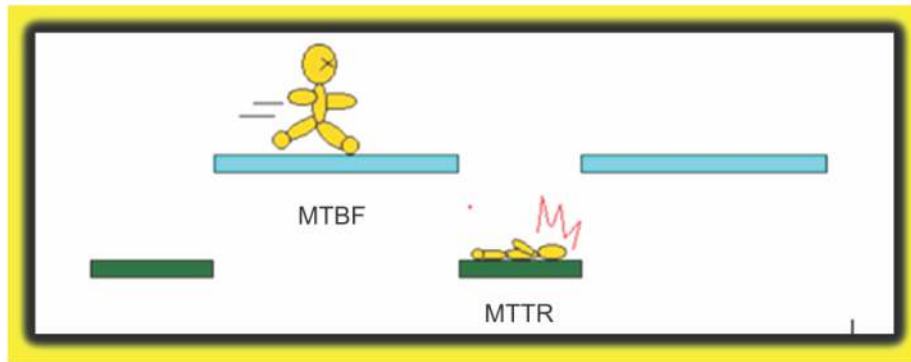
At the end of operations when all the load has been taken off from the generator, always end with a three to five minutes cooling run, come what may! Rain or shine! It drives away excessive heat from sensitive engine parts (especially turbochargers) and prevents expensive repairs later on due to carbon deposits resulting from degradation of oil at high temperatures.

46. HALLMARK OF QUALITY SERVICE - کوالٹی سروس کا طرہ امتیاز

MTTR & MTBF

MTTR refers to “mean time to repair”. It shows speed of response and repair when machine breaks down.

MTBF refers to “mean time between failures”. It shows the quality of repair.



The hallmark of quality service is low MTTR, high MTBF and maximum availability.



47. COME TO A GRINDING HALT - کھیل ختم پیسہ ہضم

CAUSES OF ENGINE WEAR WHICH “PUTS THE BRAKES ON PERFORMANCE”

Engine wear is caused by:

- Contact between parts
- Pressure (BMEP)
- Relative Motion

There are two types of wear i.e. “Normal wear and Abnormal wear”.

The major wear items are:

- Cylinder liners
- Seals & gaskets
- Piston rings
- Turbo bearings and seals
- Valves, guides, and seats
- Main and rod bearings

Abnormal wear is caused by the following:

1. Incorrect installation
 - Insufficient fresh air for engine aspiration
 - Improper, free flowing exhaust away from incoming air for induction.
2. Incorrect maintenance or operating techniques
3. Lack of cleanliness
4. Using the wrong oil,
5. Extending oil changes interval,
6. Not maintaining the coolant concentration, (results in liner pitting & cavitation)
7. Inadequate machine warm-up,
8. No cooling run,
9. Poor daily maintenance (weakest link)
10. Poor attention to Maintenance Commandments – Ten Commandments
11. Bypassing safeties – Protective cover
12. Low load operation
13. Unbalanced operation, etc.
14. Engine exercising during storage / idle periods

The parts which may fail prematurely are cylinder block, crankshaft, cylinder heads, connecting rods, pistons, etc.

48. NO NEED TO CUT CORNERS IN GENERATOR MAINTENANCE – **RECOGNIZE THE PRINCIPLE OF VITAL FEW VS TRIVIAL MANY –** پریٹوکا اصول

Most customers spend a fortune in buying generators. But close their fists when it comes to spending money on maintenance, parts and training. Little do they realize that جہاں لاکھ وہاں سوالا کھ will not make

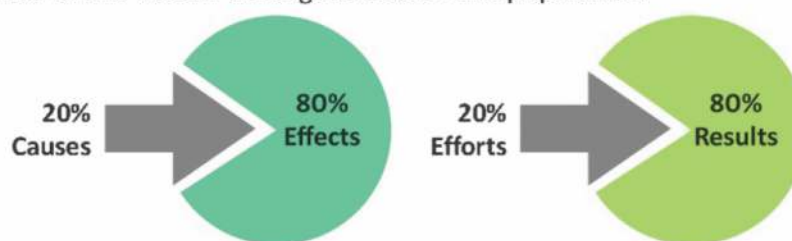
much of a difference. If they take maintenance seriously, they will realize that there is not much to worry. They need not to run from pillar to post, from one vendor to another to find solutions of their generator problems. Their problems are caused by mainly six reasons.

More than a century ago, an Italian scientist Pareto discovered that approximately 80% outcomes are caused by approximately 20% reasons. This is true for any population and is exemplified by the following picture:

- Pareto Analysis

Examples:

- ❑ 20% of car drivers cause 80% of the accidents.
- ❑ 20% percent of workers do 80% of the work.
- ❑ 20% of a company's clients are responsible for 80% of its revenue
- ❑ 20% of the time spent on a task leads to 80% of the results.
- ❑ 80% of the customer complaints come from 20% of customers.
- ❑ 80% of the wealth belongs to 20% of the population.



Continuous Improvement Toolkit . www.citoolkit.com

In generators also the same rule is applicable. 80% generator issues are caused by 20% factors. There are six main reasons which cause generator failures or lack of performance. Take care of these six and you will be on the course to receive maximum benefits from your machine.

Primary Cause of failure and / or poor performance: (Note 80/20 Rule: 80% of issues are caused by 20% reasons)

Item #	Issue	Primary Cause	Remedy and ongoing action
1	Generator Fails to Start	Battery	Faulty battery or charger – Test battery charger and replace if necessary
2	Generator Fails to Start	No Fuel	Check fuel level, if OK check fuel delivery and quality, consider fuel polishing
3	Shutdown due to Low Oil Pressure	Oil Level too Low	Check dipstick, and ensure oil top off part of planned maintenance program (PMP)
4	Shutdown due to High Temperature	Low Coolant Level	Coolant levels should be checked and coolant check part of PMP
5	Generator Set Poor Performance	Filtration Systems	Clogged fuel and air filters will retard performance, change in PMP
6	Generator Does Not Carry Full Load	Carbonization	Lightly run engines build up carbon, fully load and have load bank testing service

The six major issues and their remedies are as under:

Unit will not start due to battery

80% of generators' failures to start are due to faults in the set's battery. Weak or low charged batteries are a common occurrence. Even a well-charged, well-maintained lead-acid battery will deteriorate over time. Batteries must be replaced when they no longer hold a proper charge. Battery charger systems and alternators should be checked weekly on sets used for standby and emergency applications, and at least monthly on other applications

Unit will not start due to fuel

Lack of fuel or low quality fuel are often reasons generator-set engines fail to start or to give rated power. Fuel quality should be checked as part of any planned maintenance visit. Technicians working on diesel-fueled units will check if water or other contaminants are in the fuel or in the unit's filtration or delivery systems. Having no fuel in diesel and gaseous units could be due to a lack of storage capacity or poor delivery from the on-site storage.

Failure due to low oil pressure

We recommend that the oil level for prime power sets be checked daily and maintained as closely as possible to the dipstick 'full' mark. The most accurate readings are taken ten minutes after running the unit under load and shutting down.

High temperature failure

Low coolant levels due to cooling system leaks are the most common reason engines fail because of overheating.

Filters leading to reduced performance

The air, oil and fuel filter elements must be changed per manufacturer's recommendations or whenever necessary due to site operating conditions. Any blockage will restrict flow and result in reduced performance. Air and oil filter blockages also contribute to excessive engine wear.

Failure to carry full load

Regular testing under full load will identify issues that could prevent the generator from taking its rated load. Standby/emergency installations should be regularly exercised for at least 30 minutes with a minimum 30 percent electrical load at least once a month. For critical standby applications, this is often increased to once a week. Fuel quality can also be a reason of poor performance.

49. CAUSE AND EFFECT RELATIONSHIP

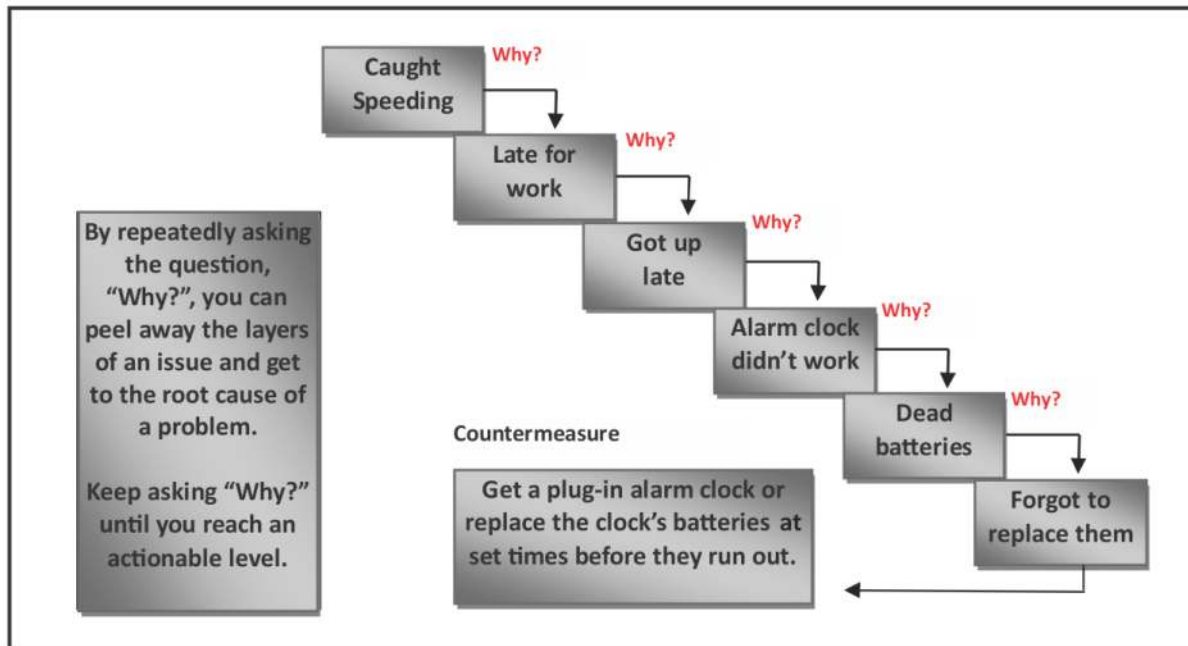
A SCREW IS LOOSE SOMEWHERE – کہیں تو کوئی کسر ہے!

Where there is smoke there is a fire! Where there is a problem, there is a cause!

It is the job of a good service engineer to carry out a root cause analysis and find out which screw is loose, where, why and to what an extent.



BY REPEATEDLY ASKING THE QUESTION “WHY”, YOU CAN PEEL AWAY THE LAYERS OF AN ISSUE AND GET TO THE ROOT CAUSE OF A PROBLEM. FOR EXAMPLE, WHY WAS YOUR EMPLOYEE CAUGHT SPEEDING?



50. EAT A HUMBLE PIE – کفِ افسوس ملنا

When the going goes tough, one does not rise to the occasion. In fact he sinks to the level of the training he has received. Please leave no stone unturned to train yourself and your people.

CFO asks CEO: “What happens if we invest in developing our people and then they leave us?”

CEO: “What happens if we don’t, and they stay?”

An organization without training, development, continuous improvement gets out of control and runs amok, illustrated by the figure below. It leaves its stakeholders rubbing their hands while regretting and repenting.



51. PREVENT YOUR ENGINE FROM GOING TO DOGS - انجن کا دھڑن تختہ ہونے سے بچائیں

Don't let your engine go to dogs. Never disable the safeties of your machine. Learn more about engine safeties in our "Meet & Treat" sessions.

52. BETTER WEAR OUT THAN RUST OUT - بے کار سے بے گار بھلی



The doctor told the patient, "It's not that diabetes, hypertension, heart diseases or obesity which runs into your family. It's that no one runs in the family."

Similarly, it's not the high load running on your generator which destroys it. It is the lack of load on the generator which plays havoc with it.

Though low load on generators may appear to be beneficial, in reality it is not so. It results in premature failure of the generator. Recommended values are as follows:

Diesel generator – not less than 35 – 40%

Gas generator – not less than 65 – 70% (why higher? – Contact ESL)

Diesel Engine Under variable Load

Load levels in percentage of maximum continuous rating

0 – 25%	Extreme low load
25 – 40%	Low load
40 – 80%	Regular generator operation load
80 – 90%	High load
90 – 100%	Extreme high load

Low load operations of diesel engines cause lower cylinder pressure and thus lower temperature.

Low temperature can lead to ignition problems and poor combustion which causes increased soot formation and aggregation of unburned fuel in the cylinder. Low cylinder pressure, soot and unburned fuel deteriorate the piston ring sealing efficiency allowing hot combustion gases, soot particles and unburned fuel to leak past the piston rings. This results in increased lubricating oil consumption and dilution. Fuel dilution of the lubricating oil reduces the viscosity which can collapse critical oil film thicknesses. This can cause premature wear of pistons, rings, liners and crank case bearings. The mechanisms of low load lead to a cycle of degradation which means that diesel engines that run at low loads for longer periods of time can become irreversibly damaged.

Like all internal combustion engines, to operate at maximum efficiency a diesel engine has to have exactly the right air-to-fuel ratio and be able to sustain its designed operational temperature for a complete burn of fuel.

When a diesel engine is operated on light loads, it will not attain its correct operating temperature. When the diesel engine runs below its designed operating temperature for extended periods, unburned fuel is exhausted and noticed as wetness in the exhaust system. Hence, it is also called "wet stacking".

When unburned fuel is exhausted out of the combustion chamber, it starts to build up in the exhaust side of the engine, resulting in fouled injectors and a buildup of carbon on the exhaust valves, turbo charger and exhaust. Excessive deposits can result in a loss of engine performance as gases bypass valve seating, exhaust buildup produces back pressure, and deposits on the turbo blades reduce turbo efficiency. Permanent damage will not be incurred over short periods, but over longer periods, deposits will scar and erode key engine surfaces.

Also, when engines run below the designed operational temperature, the piston rings do not expand sufficiently to adequately seal the space between the pistons and the cylinder walls. This results in unburned fuel and gases escaping into the oil pan and diluting the lubricating properties of the oil, leading to premature engine wear.

Why to Avoid Wet Stacking:

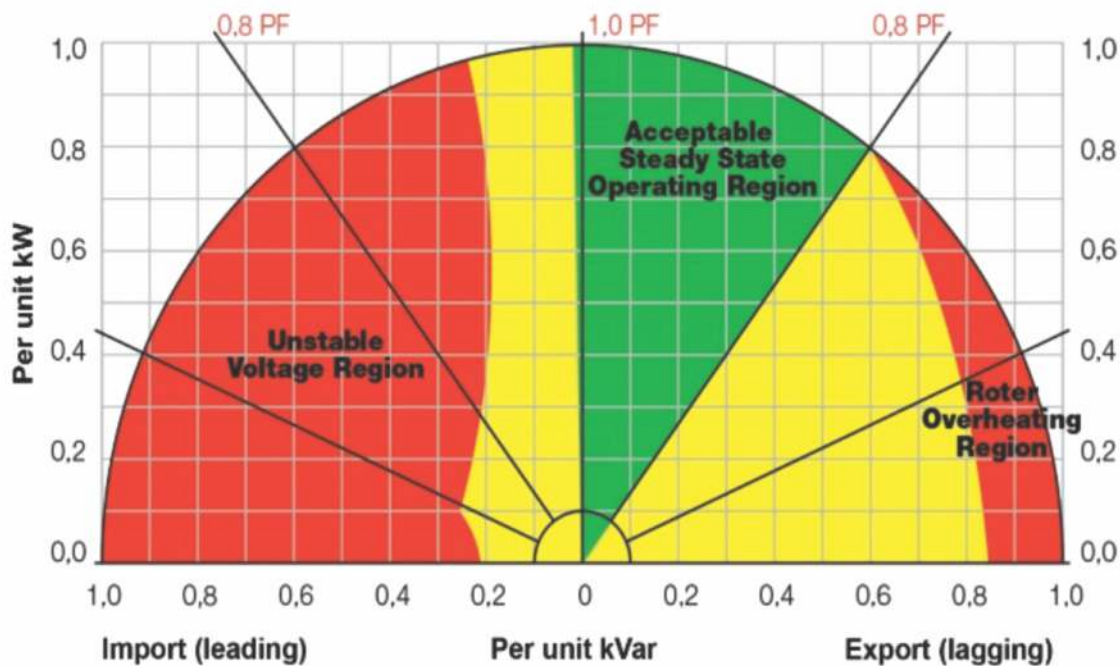
- Expense - Excessive wet stacking will shorten engine life by many years and before planned replacement.
- Power - Even before an engine is damaged, deposits will reduce maximum power. A prematurely worn engine will have a lower maximum power than it was designed to develop.
- Maintenance - An engine experiencing wet stacking will require considerably more maintenance than an engine that is adequately loaded.

53. CATCH 22 SITUATION - نہ جائے رفتن نہ پائے ماندن



We often use capacitors banks in our factories to improve power factor, increase power utilization and reduce current flowing through the cables. These power factor correcting devices, if used excessively with our generators, do help to a certain extent by keeping the current flowing through the windings down. However, their excessive use can result in exciter losing control of the voltages and hence premature failure of the whole alternator.

Steady state alternator reactive power capability curve



Too little correction results in overheating of windings. Too much may result in alternator damages. This is a CATCH 22 situation or a "caught between two stools" type situation. Learn more about it in our "Meet & Treat" sessions.

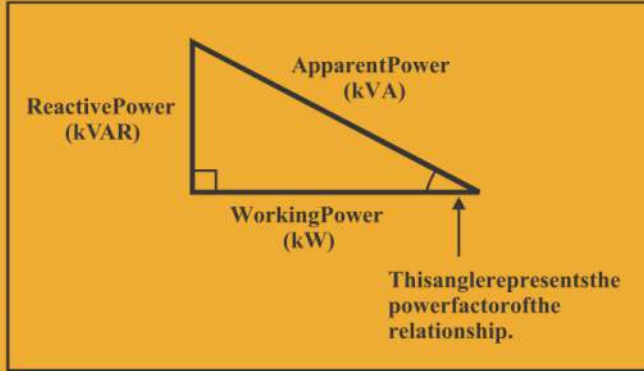


You will find the following article very useful in our training book.

پاور فیکٹر (Power Factor)۔ ایک معمہ سمجھنے کا، نہ سمجھانے کا۔۔۔

(ESL کتابچہ برائے ٹریننگ - ڈیزل اور گیس جنریٹرز سے ماخوذ)

برسلاؤ شہر کے وسط میں ایک شراب خانہ واقع ہے جہاں نہایت عمدہ قسم کی شراب خاص مہمانوں کو پیش کی جاتی ہے۔ شراب کا ایک گلاس تقریباً سو ڈالر میں دستیاب ہوتا ہے۔ ہر گلاس میں تقریباً اسی فیصد شراب ہوتی ہے اور بیس فیصد اسکا جھاگ۔ یعنی گلاس کی اسی ڈالر شراب کے لئے ادا کرتا ہے اور بیس ڈالر محض اس جھاگ کے لئے جو اسکے کسی کام کا نہیں۔ پھر اچانک برسلاؤ کی انتظامیہ یہ فیصلہ کرتی ہے کہ گلاس کو اتنے ہی پیسے ادا کرنے ہوں گے جتنی وہ شراب نوشی کرتا ہے۔ یعنی اب اسکو جھاگ کے پیسے ادا کرنے کی قطعی ضرورت نہیں۔ اس فیصلے سے شراب خانے کا کاروبار بری طرح متاثر ہوتا ہے اور وہ ایک منافع بخش ادارے سے تبدیل ہو کر غیر منافع بخش ادارہ بن جاتا ہے۔



کچھ اسی طرح کی صورتحال کا سامنا بجلی فراہم کرنے والی کمپنی کو بھی کرنا پڑتا ہے۔ وہ بجلی کا ایک گلاس صارف کو فراہم کرتی ہے اور صارف اس میں سے فقط 70 تا 80 فیصد کا آمد استعمال کے لیے خرچ کرتا ہے۔ باقی 20 تا 30 فیصد بجلی جھاگ کی طرح دھری کی دھری رہ جاتی ہے۔ بجلی فراہم کرنے والی کمپنی مثال کے طور پر ایک لاکھ روپے کی بجلی فراہم کرتی ہے اور صارف اس کے صرف 70 تا 80 ہزار روپے ادا کرتا ہے۔ جانتے ہیں ایسا کیوں ہے؟ ایسا پاور فیکٹر کی بدولت ہے۔۔۔!

پاور فیکٹر استعمال کی جانے والی بجلی اور فراہم کی جانے والی بجلی کا حاصل تقسیم ہوتا ہے۔ بجلی kVA میں فراہم کی جاتی ہے جبکہ اسکا استعمال kW کی صورت میں ہوتا ہے۔ ان دونوں کے درمیان جو فرق ہوتا ہے وہ محض جھاگ ہے۔

بقیہ آرٹیکل کے مطالعے کے لیے ہماری ویب سائٹ کے لنک <http://eslpk.com/download/ch14.pdf> پر کلک کیجیے یا کتاب کے مفت حصول کے لیے customer@eslpk.com پر رابطہ کیجیے۔

54. A CHAIN IS ONLY AS STRONG AS ITS WEAKEST LINK –

زنجیر کی مضبوطی اُس کی کمزور ترین کڑی کے برابر ہوتی ہے

Daily maintenance is highly neglected by lot of customers operating and maintaining generating sets. This is often the weakest link and it makes whole operation and maintenance exercise highly susceptible to uncalled for problems. Please read ESL article:

روزمرہ دیکھ بھال میں غفلت۔ زنجیر کی کمزور ترین کڑی

55. SMALL LEAKAGES, BIG CONSEQUENCES

SMALL LEAKS CAN SINK BIG SHIPS - چھوٹا سوراخ بڑا جہاز ڈبو سکتا ہے

Beware of leaks in engine cooling system; lube oil system, exhaust system and air intake system. Engines may seize because of leaking water hoses and leaks in exhaust system can quickly turn it into ash. Because of the risks associated with these leakages, they are part and parcel of daily check activities.



56. RED RAG TO THE BULL – آنیل مجھے مار



Generators with low and unbalanced load on three phases may soon find themselves in hot waters. The rule is that loads should not be more than 10% off balance from each other. Please see more details in our Training Book article:

غیر متوازن لوڈ کی ستم ظریفیاں

57. PUT YOUR MONEY WHERE THE MOUTH IS - وسائل استعمال کریں وہاں، نتائج بہترین ہوں جہاں

Do you know that almost 80-90% of the cost of generating electricity from diesel generators in Pakistan is made up of fuel cost? Hence, maximum attention should be given to proper operation, fuel system maintenance and calibration and quality of fuel injected into the engine.

Please read an excerpt from ESL Training book to further understand the importance of fuel system.

مندرجہ بالا اعداد و شمار سے اس بات کا اندازہ ہوتا ہے کہ ڈیزل جنریٹر کی کل مدتی قیمت (Total Lifecycle Cost) میں ڈیزل کا حصہ کم سے کم 80 فیصد ہوتا ہے۔ یہ وہ حقیقت ہے جس سے اکثر لوگ اعراض کرتے ہیں اور فلٹرز، پریزوں اور آپریٹرز کی مد میں پیسے بچانے میں اپنا سارا زور صرف کر دیتے ہیں جبکہ ان تینوں چیزوں کی کل قیمت بجلی کی پیداواری قیمت کی محض 5 سے 6 فیصد ہوتی ہے۔ یہی وجہ ہے کہ ہم کہتے ہیں ”اشر فیاں لئیں اور کولوں پر مہر“۔

اوپری ہوئی مثال نہ صرف ایک میگا واٹ کے جنریٹر پر صادق آتی ہے بلکہ اس کا اطلاق کم و بیش تمام ڈیزل جنریٹرز پر ہوتا ہے۔ فہم و فراست کا تقاضا یہ ہے کہ آپ اپنی کوشش وہاں خرچ کریں جہاں زیادہ اور بہتر نتائج کا حصول ممکن ہو۔ اسکو پریٹو (Pareto) کا اصول بھی کہا جاتا ہے۔ اگر آپ فیول کی مد میں محض 2 سے 3 فیصد رقم بھی بچالیں تو اخراجات میں خاطر خواہ کمی کر سکتے ہیں۔ آئیے، دیکھتے ہیں کہ یہ بچت کیسے کی جاسکتی ہے۔

ESL Customer Care Overhaul rates as percentage of fuel cost										
KVA Rating	KW Rating	Specific Fuel Consumption (liters/kWhe)	70 % Load	Hourly Fuel Consumption (liters)	Hours at major overhaul	Fuel Consumption in 10,000 hours (liters)	Fuel Cost (PKR)	Total Fuel Cost in 10,000 hours (PKR)	Major Overhaul Rates (PKR)	Overhaul Rates as % of Fuel Cost
30	24	0.3	16.8	5.04	10000	50400	100	5,040,000	240,000	4.8%
50	40	0.3	28	8.4	10000	84000	100	8,400,000	350,000	4.2%
100	80	0.3	56	16.8	10000	168000	100	16,800,000	800,000	4.8%
200	160	0.3	112	33.6	10000	336000	100	33,600,000	1,200,000	3.6%
300	240	0.3	168	50.4	10000	504000	100	50,400,000	1,500,000	3.0%
500	400	0.285	280	79.8	10000	798000	100	79,800,000	2,400,000	3.0%
750	600	0.285	420	119.7	10000	1197000	100	119,700,000	6,000,000	5.0%
1000	800	0.285	560	159.6	10000	1596000	100	159,600,000	10,000,000	6.3%

- ۱۔ جنریٹر کو اس کی مقررہ ریٹینگ سے قریب تر استعمال کریں یعنی جنریٹر پر لوڈ اوسطاً 70 سے 80 فیصد ضرور رکھیں۔
- ۲۔ اگر لوڈ میں تغیر زیادہ ہو یعنی کبھی تو لوڈ گھٹ کر 20 سے 30 فیصد رہ جائے اور کبھی 100 فیصد تک جا پہنچے تو ایسے میں ایک بڑا جنریٹر استعمال کرنے کے بجائے دو یا زائد چھوٹے جنریٹر پیرالل (Parallel) کر کے استعمال کریں۔ مزید معلومات کے لیے ای ایس ایل (ESL) سے رجوع کریں۔
- ۳۔ صرف مستند سپلائرز سے فیول حاصل کریں اور اس کی کوالٹی پر کسی قسم کا سمجھوتہ نہ کریں۔ مشاہدے میں آتا ہے کہ بڑے بڑے ادارے بھی اس سلسلے میں کوتاہی کے مرتکب ہوتے ہیں۔
- ۴۔ فیول کی لائن میں واٹر سپریٹر (Water Separator) کو ضرور استعمال کریں۔
- ۵۔ فیول فلٹرز اور آئل فلٹرز کی کوالٹی پر کوئی سمجھوتہ نہ کریں۔
- ۶۔ فیول پمپ اور انجیکٹرز (Injectors) کی استعمال اور ماحول کے حساب سے ضرور کیلیبریشن (Calibration) کرائیں۔ محض یہ عمل فیول کی خاطر خواہ بچت کا ذریعہ ہو سکتا ہے۔
- ۷۔ انجن کی میکینیکل اور الیکٹریکل صحت کا ہمہ وقت خیال رکھیں۔ مینینٹنس پر کبھی سمجھوتہ نہ کریں۔
- ۸۔ فیول کی ممکنہ لیکج اور چوری پر نظر رکھیں اور ایماندار اور تربیت یافتہ آپریٹر کی نگرانی میں جنریٹرز چلائیں۔ ایسا کرنے سے آپ فیول کے استعمال میں ضیاع کو خاطر خواہ حد تک کم کر سکتے ہیں اور اپنی بجلی کی پیداواری لاگت کو کنٹرول کر سکتے ہیں۔

STRAIGHT FROM THE HORSE'S MOUTH - احوال خلق بزبان خلق



Talk to the parts; listen to their voice and perform maintenance based upon this conversation. This is called condition based maintenance. For more details, please read ESL training book article:

حالات پہ منحصر میٹیننس - پُر زوں سے گفتگو

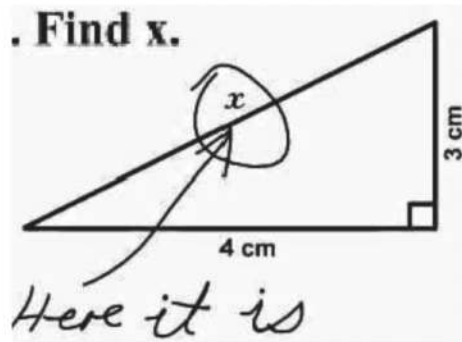
59. FIND X!

CAKEWALK - سیدھا سادھا کام

Customers are fully aware that fuel cost is almost 80 ~ 90% of the total cost of electricity generation from a diesel engine.

Saving large sums of money on fuel consumption is now very simple. Please visit ESL fully air conditioned, dust free and well equipped fuel system calibration facility.

ESL has the capability to calibrate almost all types of fuel pumps and injectors at nominal cost and allows customers to receive huge benefits by reducing fuel consumption. This is now very simple. It is as easy as a cakewalk. Yet not as straightforward as the following response by an innocent student!



60. MOUNTAIN OF A MOLEHILL - رائی کا پہاڑ

Generator problems are mostly very small. Inattention to them converts these mole hills into mountains. For example

- Inattention to battery maintenance often leads to weakening of the batteries and starting problems
- Small leaks in the cooling system can lead to burnt out head gaskets and seizure of the engine
- Poor coolant quality can result in holes in the liners and may lead to mixing of water with oil

- Poor lubrication can result in poor engine cooling, poor sealing between piston rings and liners, etc., leading to loss of engine power
- Leaks in air intake system can result in ingress of sand and dust in the cylinders leading to premature failure of engine liners and piston rings
- Small leaks in the exhaust system can completely burn down the engines specially when it is housed in a canopy

We must not let any of these molehills become a mountain through good and timely maintenance.



61. UNION IS STRENGTH - اتحاد میں برکت ہے

Remember the story narrated by a dying father to his four sons using a bundle of sticks and demonstrating how all four of them acting together are stronger than each one acting singly.

Similarly generators paralleled together are better than one generator acting singly.

Parallel your generators to act like one. Seek help from ESL which can easily parallel generators of any make, model and manufacturer with hundred percent in-house resources.



Try to understand it from another perspective as under:

Is it possible that sum of parts be greater than the whole? Is it possible that five Rs. 1000 currency notes be more valuable than one Rs. 5000 currency note? Not at all! But strangely five 1000 kva generator sets are more valuable than one 5000 kva generating set. This is because of generators paralleling. By so doing you avoid "putting all your eggs in one basket". For more detail, please read the ESL article:

جنریٹر پیرالنگ (Paralleling) کیا ہے؟

کیا ہزار (1000) روپے کے پانچ نوٹ پانچ ہزار (5000) روپے کے ایک نوٹ سے مالیت میں زیادہ ہو سکتے ہیں۔۔۔؟ آپ کا جواب یقیناً نفی میں ہوگا۔ لیکن ہمارا یہ دعویٰ ہے کہ ہزار کے وی اے (1000 kVA) کے پانچ جنریٹرز پانچ ہزار کے وی اے (5000 kVA) کے ایک جنریٹر سے افادیت میں کہیں بڑھ کر ہوتے ہیں۔۔۔! یعنی اجزا کا حاصل جمع بکل سے بڑھ کر ہو سکتا ہے (Sum of parts is greater than the whole)۔۔۔ جی ہاں۔۔۔! لیکن ایسا ممکن ہے صرف جنریٹرز کی پیرالنگ (Paralleling) کے ذریعے۔۔۔!

There are several major advantages to operate generators in parallel:

- **Several generators can supply a bigger load than one machine by itself.**
- **Having many generators increases the reliability of the power system.**
- **It allows one or more generators to be removed for shutdown or preventive maintenance.**

For more details, find information in the following manual.



62. WHERE THERE IS SMOKE THERE IS A FIRE - دھواں وہیں سے اُٹھتا ہے جہاں پر آگ ہوتی ہے

A machine failure is not without a rhyme or reason. Where there's smoke there is a fire. Poor operation and maintenance are often the reasons of machine failures. Please take care of daily maintenance, oil and filter changes at specified intervals, engine cooling system, batteries, amount and distribution of loads on three phases, etc. If you do these, you will take care of most important reasons for engine failure.



63. ROCK AND A HARD PLACE - دوہری مشکل

Whether to switch on power factor correction devices or abstain is a tricky question. **You are between a rock and a hard place.** If you don't switch them ON, too much current passes through the generators' alternator windings at peak loads causing them to heat up in peak summers. When you switch them ON, you take the risk of exciter losing control of the voltages and consequently causing damage to the alternator which amounts to

اُدھر کنواں، اُدھر کھائی

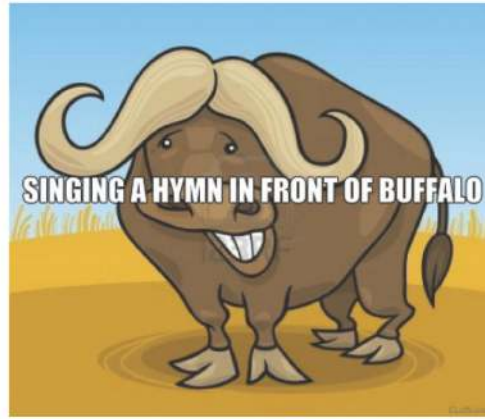


Please contact ESL for further details in its "Meet & Treat" sessions.

64. SINGING A HYMN BEFORE A BUFFALO - بھینس کے آگے بین بجانا

Our Director Commercial, Mr. Junaid Shahzad, was a special person. He would constantly tell his colleagues that performing job alone is not enough. Performing job rightly is obligatory. Furthermore, performing the job rightly is not enough. Performing the right job is required. He was always trying to emphasize the difference between efficiency and effectiveness and was constantly explaining, for many years, that effectiveness is more important than efficiency. He would also try to explain that efficiency when combined with effectiveness gives rise to great achievements. But efficiency and effectiveness when combined with sincerity and faith give rise to wonders. Miracles come into being. Champions are born! His constant reminders, however, were not understood by majority of engineers. His rhetoric mostly fell on deaf ears or would go in from one ear and out from the other.

مرد ناداں پہ کلام نرم و نازک بجاثر



65. CUSTOMERS' DILEMMA!

A ROLLING STONE GATHERS NO MOSS – نہ تیرہ (۱۳) میں، نہ تین (۳) میں

Customers often shuffle from one brand of generator to another and one supplier to the next because they believe the one they don't have is better than the one they have. The result is that they become a rolling stone. They end up with a variety of dissimilar brands with little synergy and a long list of vendors with little in common.

Instead they should take care of the grass on their side. It will also turn green.



66. KNOWLEDGE IS POWER – علم بڑی طاقت ہے

Knowledge is power only if we, as engineers, have the proper attitude. An engineer with proper attitude has the following traits:

1. He is a man of integrity, honesty and upright, God fearing character.
2. He believes in giving more than he receives.
3. He believes in performing more than he promises.
4. He opens his shop the earliest and pulls the shutters down last.
5. Notwithstanding the above, he believes in SMART work even more than he believes in HARD work.
6. He combines effectiveness with efficiency and vice versa.
7. He never gives up and believes that "winners are not quitters and quitters are not winners".
8. He continuously looks to upgrade his skills set and more importantly mindset.
9. Instead of moaning and groaning, he makes things happen while others around him wonder what he is making happen.
10. Success does not get to his head nor do failures get to his heart.
11. When the going gets tough, he gets going.



Through sheer attitude, he makes things happen while others around him simply wonder what has happened. Knowledge is power for him only because it is augmented by his tremendous attitude.

When the knowledge is complimented by proper and perfect attitude, it starts doing wonders. Impossible becomes possible. It can even pass a camel through the eye of a needle. Look what has Google done; where Apple and Microsoft have taken the whole world to. How WhatsApp has revolutionized our life. The way Careem and Uber are providing solutions to our commutation problems is stupendous. These all are the wonders of knowledge coupled with attitude.



67. IF THINGS WERE TO BE DONE TWICE, ALL WOULD BE WISE – پہلی غلطی بھول تو دوسری نالا نقتی

Remember, most customers don't give you a second chance. Do it right first time, every time, all the time. For more details, please read the poet's rendition of ESL quality policy.

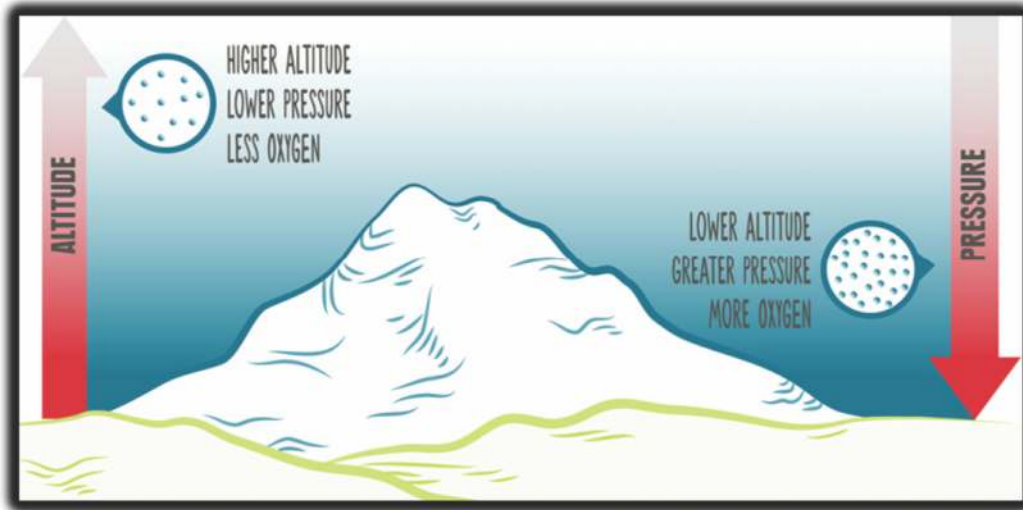
**Fool me once.
Shame on you.**

**Fool me twice.
Shame on me.**

68. HIGH & DRY – بے یار و مددگار

Many of us have experienced difficulties in breathing at hilltops and mountainous areas. Similarly, we run out of breath easily in hot conditions.

We have also experienced that our food is not easily cooked when we are picnicking on hilly areas. This is all because of air being less dense and air pressure being less than standard 14.7 psi. Lower air pressure and less dense air means there are fewer oxygen molecules available.



Air which is short on oxygen molecules at elevated temperatures or elevated altitudes leaves our generators also high and dry. It reduces the power they can produce and this reduction is generally termed as engine deration.



Engine deration, however, is not caused only by high temperatures and high altitudes.

- It is also caused by whether we are operating our generators on island mode or grid parallel mode (for more clarification, please discuss).
- It is also caused by quality of gas for gas generators. Lower methane number results in engine deration.
- It is also caused by what is the LT return temperature of your gas generator. Generators with higher LT return temperature are less prone to engine deration than those with lower LT return temperature.

For more details on engine deration, please contact ESL.

69. POOR PAPERWORK!

SPINNING THE WHEELS WITHOUT GOING FORWARD - کارِ لا حاصل



Young engineers are often poor in paperwork. Their writing abilities become a yoke around their necks. They must realize that nothing gets finished till the paper work is completed. So they must sharpen their writing skills. The sooner, the better! After each job involving trouble shooting, they should, as a minimum, write a report clearly stating the complaint, its causes, corrective action(s) and steps to control & conform etc. It is highly recommended that they should do a course in business communication from a renowned business school.

Failure to do quality paper work will result in spinning the wheel without advancing forward in their careers.



**No job is
finished till the
paperwork
is done!!**



ESL POLICIES

Our Code of Conduct:

"FOLLOW THE ETHICS" is our advice to honorably survive.

Our Business Policy

Increase community services with profitable growth and fair practices!

Our Safety Policy

Safety first, even if the business is hurt!

Our Quality Policy

Quality second to none with continuous improvement.

Our HR Policy

Employee welfare, with family type care!

Our Sales Policy

Win hearts and minds of customers to increase market share!

ESL CODE OF CONDUCT

"Follow the ETHICS" is a wise advice
A recipe to honorably survive.

Neither give nor accept any bribe
On the road of success you will merrily drive.

Take no interest on the loans you provide
Doing so business is multiplied.

When people rub you on the wrong side
Repel evil with good and what is right.

Regularly pray as prescribed
With peace of mind you'll never be deprived.

Do what you say and say what you do
You will be loved if you are honest and true.

Perform more than you promise to do
Make people win, you will win too.

Retain existing customers and create new
Increase your skills and continuously review.

Avoid conflict of interest despite temptation
Deliver hundred percent with full devotion.

Increase welfare services for a less privileged one
Be fair with everyone and discriminate with none.

Show no disrespect to the competition
With diligence earn recognition.

Fulfill your obligations as a good corporate citizen
Obey the law of land without an exception.

Success will come to you from every direction
Compliance with ethics is a precondition.



NUTS AND BOLTS OF OUR BUSINESS POLICY

Our VISION is crystal clear

We will increase our community services every year.

Service is worship and our main sphere.

Our MISSION is to be a leading player

Safety first, Quality second to none and Sales efforts sincere

Project Management (*) will be the forte of our engineer.

Our Safety Policy will control risks and reduce fear

Quality policy will keep raising the performance bar to the next tier.

The HR Policy will ensure employees' welfare

While Sales Policy will gradually increase the market share.

No lies, no bribes, nothing unfair

To the government policies we will fully adhere.

ESL will perform more than it promises & maximize customer care

Be it Sales, Service or Spare.

(*) Project Management = Doing things rightly, timely & cost effectively

OUR SAFETY SPEECH

Safety of our people and organization on the whole
This is our top priority and biggest goal.

Safety is everybody's business
But the management has the biggest role.

Safety will be observed all the time
At work or at home, with heart and soul.

Safety meetings will be held on a regular basis
It will be as important as the monthly pay roll.

Pause and reflect every now and then, intervene if a danger is seen;
An ounce of safety prevents tons of disaster control.

Count your Goal Zero score
Staying safe for longer number of days is important for every soul.

Wear helmet; fasten seat belts, no mobile phones
Drive safe with a journey plan and speed control.

Poor housekeeping causes most accidents if not all
A clip can cause a slip, even wet floor can take its toll.

Identify hazards, measure risks, exercise control and review often
This is our recommended safety protocol.

Hazard elimination, substitution & isolation-our hierarchy for risk control
Use engineering & administrative tools & PPEs to cover any other loophole.

Recommended safety protocol and hierarchy for risk control
We will follow them whether we rush for work or leisurely stroll.



OUR QUALITY COMMUNIQUE

Whether we sell an equipment or simply install
We will do the job right and spare no effort at all.

We will do what we say and vice versa
Making sure, we neither falter nor fall.

Quality will be built in our services, at every step
Be it a big step or very small.

We will train our people continuously
Our aim is to meet all challenges and avoid any pitfall.

We will accept our mistakes and learn from them
Doing so, our progress will never stall.

Plan-Do-Act and Check
This is a quality tool often discussed in our conference hall.

The rule of Pareto is our guiding principle
We will focus on critical mass first and then what is small.

We will use Poka Yoke systems
Our target is no mistakes at all.

Benchmark against best-in-class amongst all
We will learn from best practices of others to stand equally tall.

Zero defect is our ultimate goal
Success will depend on this over the long haul.

Our product may fail and service fall short
We will fix it and allow no shortfall.

Talking to the parts and condition based maintenance
This is our genset service strategy for every Mill or Shopping Mall.

Parts we sell may cost more
We'll make sure your plants run and not just crawl.

ESL strives to raise quality and lower life cycle cost
Be it a power plant or just a major overhaul.

Any lapse in our quality is not acceptable
If you see one just give us a call.

Neglecting quality is a dangerous thing
It is like playing with a fireball.

The race to quality has no finish line
Continuous improvement is the only cure-all.

OUR HR POLICY HIGHLIGHTS

Attractive remuneration for every colleague
Customer satisfaction is the ultimate result we seek.

Minimum wages always higher than the ones decreed
Our policy is to take care of the poor and the weak.

Vacations comprising planned, sick and casual leaves
Our people must rest properly to raise performance to its peak.

Overtime for every eligible colleague
It is paid before they ask or speak.

Hospitalization coverage up to 80% fees
Company may pay 100%, if the case is unique.

Minimum one bonus on a main festival eve
If the balance sheet has a good physique.

Interest free loan for the one who is in need
One year after repayment, he may again proceed.

Monthly ration for every deserving colleague
To help the needy, this is our humble technique.

One who travels and stays night out in other cities
Daily allowance besides traveling and boarding on actual receipt.

Gratuity for those who qualify and for a reason leave
They are welcome back if the company again has a need.

A culture of training and continuous improvement indeed
Our tool to stay in the business, excel and compete.

Performance appraisal based on attendance, quality and speed
Attitude is the key which makes even mediocre perform a feat.

Peace of mind, honor, dignity and prestige
Join ESL if you want to succeed!



OUR SALES SERMON

Minimum five customers a day
Adversity will be driven away.

When the market is bad and sales in disarray
Increase your customer visits, the sales experts say.

Identify the critical mass first; make it your mainstay
Visit the other customers some other day.

Enough revenues will result from five customers a day
Abundant for your own and many similar employees pay.

Know your company & products, market & customers and competitors, as well as you may
Success will come to you even if you are not an MBA.

Sell yourself first with a sincere smile in a pleasing way
Generate customer interest with enthusiasm to make headway.

Be persistent, show patience till the customers buy or shy away
Never lose heart nor dismay.

Identify your customer's needs by listening intently to what he has to say
He will turn your fate into gold from clay.

From the sentry on the gate, to the Chairman Secretariat as you move up your way
Delight everyone with good manners and training material as giveaway.

Cold calling & qualifying; presenting & handling objections; closing to a post sales survey
If you don't do these well, refresh straightaway.

Don't lie, don't bribe, be a symbol of fair play
Or else you may succeed for a while, ultimately fall a prey.

Perform more than you promised and the customer agreed to pay
Keep him in the business; he will make sure you also stay.

Your product support should be instant and efficient be it any hour of the day
Otherwise, the customer will abandon you and part his way.

Never sell; assist him to buy in the best possible way
He will buy only from you even if your hair turn grey.

Explain the features, advantages and benefits of your products and preferably display
He will buy from you instantly or with some delay.

Don't talk low of the competitors come what may
Nobody likes the guys who bark and bray.

Honesty is the best policy, a forte even today
In the long run, honesty alone will pave your way.

When he buys thank him and do more than you say
If he does not, keep trying till the doomsday.

Selling on credit is a crime; unless the customer has a good history to pay
Pillar to post you will often run, he may even betray.

Think big, work hard; and regularly pray
Your performance will never decline nor decay.

XXXXXXXXXXXXXXXXXX



FINAL WORD

If this book has added to your knowledge, please provide us with an opportunity to serve your great organization.

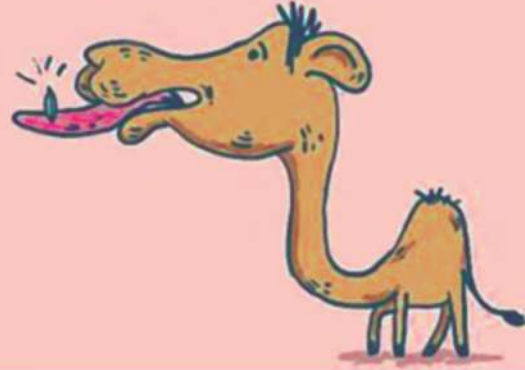
Our “Meet & Treat Programs” may become an ideal starting point whereby we can offer absolutely free of cost training to your staff and do our bit to make them ready for future challenges.

Please contact us at customercare@eslpk.com to allocate a day and date for your customized “Meet & Treat Session”.

Best Regards!

Engr. Saima Haseeb

اُونٹ کے منہ میں زیرہ



جس تھالی میں کھائیں اُس میں چھید نہ کریں



جب لوہا گرم ہو۔۔۔



احوال خلق بزبانِ خلق



بے کار سے بے کار بھلی



خدمت عبادت ہے (حصہ اوّل)

A Content Marketing Publication
for Continuous Improvement

نہ جائے رفتن نہ پائے ماندن



پُت کے پاؤں پالنے میں
نظر آ جاتے ہیں

