ELECTRONICS AND INSTRUMENTATION ENGINEERS ASSOCIATION

MUTHAYAMMAL ENGINEERING COLLEGE

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INSTRONICS

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“Our life is what our thought makes of it
Great thought comes from the heart”

We thank Our Beloved Principal ***Dr.M.Madheswaran*** *For his valuable guidance and encouragement in bringing up this magazine* ***“INSTRONICS”*** *successfully.*

\- ***EIE ASSOCIATION***

TERMS & DEFINITIONS:

CALENDER-VAN DUSEN EQUATION:

An equation that defines the resistance-temperature value of any pure metal that takes the form of RT = RO(1 + AT + BT2) for values between the ice point (0°C) and the freezing point of antimony (630.7°C) and the form RT = RO[1 + AT + BT2 + C(T-100)T2] between the oxygen point (-183.0°C) and the ice point (0°C).

CERAMIC INSULATION:

High-temperature compositions of metal oxides used to insulate a pair of thermocouple wires the most common are Alumina (Al_2O_3), Beryllium (BeO), and Magnesia (MgO). Their application depends upon temperature and type of thermocouple. High-purity alumina is required for platinum alloy thermocouples.

CHARGE SENSITIVITY:

For accelerometers that are rated in terms of charge sensitivity, the output voltage (V) is proportional to the charge (Q) divided by the shunt capacitance (C). The sensitivity is given in terms of charge; Pico coulombs per unit of acceleration.

CLOSENESS OF CONTROL:

Total temperature variation from a desired set point of system. Expressed as "closeness of control" is ±2°C or a system bandwidth with 4°C, also referred to as amplitude of deviation.

CONTINUOUS SPECTRUM:

A frequency spectrum that is characterized by non-periodic data the spectrum is continuous in the frequency domain and is characterized by an infinite number of frequency components.

CORIOLIS FORCE:

A result of centripetal force on a mass moving with a velocity radially outward in a rotating plane.

CRYOGENICS:

Measurement of temperature at extremely low values, i.e., below -200°C.

CURRENT PROPORTIONING:

An output form of a temperature controller which provides a current proportional to the amount of control required. Normally is a 4 to 20 milliamp current proportioning band.

CONTROL CHARACTER:

A character, whose occurrence in a particular context starts, modifies or stops an operation that affects the recording, processing, transmission or interpretation of data.

By:

Mr. V.CHIRANJEEVI,
FINAL YEAR(MEIEA).

SIR ISAAC NEWTON

Born : 4 January 1643
England.

Died : 31 March 1727

Fields : Mathematics, Physics
and astronomy.

Residence: England

The familiar story says that Newton invented his theory of gravitation upon seeing an apple drop. Isaac was born just a short time after the death of Galileo, one of the greatest scientists of all time. Galileo had proved that the planets revolve around the sun. Isaac Newton was very interested in the discoveries of Galileo and others.

Isaac thought the universe worked like a machine and that a few simple laws governed it. Like Galileo, he realized that mathematics was the way to explain and prove those laws. Isaac Newton was one of the world's great scientists because he took his ideas, and the ideas of earlier scientists, and combined them into a unified picture of how the universe works.

Isaac Newton's calculations changed the way people understood the universe. No one had been able to explain why the planets stayed in their orbits. What held them up?

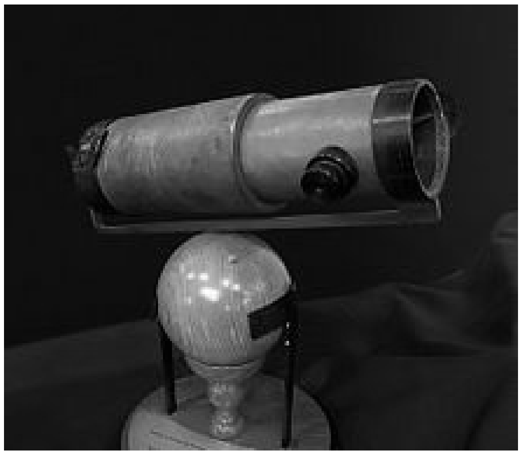

Fig:Optical Telescope.

Isaac Newton was born it was thought that the planets were held in place by an invisible shield. Isaac proved that they were held in place by the sun's gravity. He also showed that the force of gravity was affected by distance and by mass. He was not the first to understand that the orbit of a planet was not circular, but more elongated, like an oval. In 1665, he discovered the generalised binomial theorem and began to develop a mathematical theory that later became infinitesimal calculus.

Mathematics

His work on the subject usually referred to as fluxions or calculus is seen, for example, in a manuscript of October 1666, now published among Newton's mathematical papers. A related subject was infinite series. Newton's manuscript was sent by Isaac Barrow to John Collins in June 1669: in August 1669 Barrow identified its author to Collins as "Mr. Newton, a fellow of our College, and very young but of an extraordinary genius and proficiency in these things".

Mechanics and gravitation:

In 1679, Newton returned to his work on (celestial) mechanics, i.e., gravitation and its effect on the orbits of planets, with reference to Kepler's laws of planetary motion. This followed stimulation by a brief exchange of letters in 1679–80 with Hooke, who had been appointed to manage the Royal Society's correspondence, and who opened a correspondence intended to elicit contributions from Newton to Royal Society transactions. Newton's reawakening interest in astronomical matters received further stimulus by the appearance of a comet in the winter of 1680–1681, on which he corresponded with John Flamsteed. After the exchanges with Hooke, Newton worked out a proof that the elliptical form of planetary orbits would result from a centripetal force inversely proportional to the square of the radius vector.

Newton communicated his results to Edmond Halley and to the Royal Society in De motu corporum in gyrum, a tract written on about 9 sheets which was copied into the Royal Society's Register Book in December 1684. This tract contained the nucleus that Newton developed and expanded to form the Principia.

The Principia was published on 5 July 1687 with encouragement and financial help from Edmond Halley. In this work, Newton stated the three universal laws of motion that enabled many of the advances of the Industrial Revolution which soon followed and were not to be improved upon for more than 200 years, and is still the underpinnings of the non-relativistic technologies of the modern world. He used the Latin word gravitas (weight) for the effect that would become known as gravity, and defined the law of universal gravitation.

In the same work, Newton presented a calculus-like method of geometrical analysis by 'first and last ratios', gave the first analytical determination (based on Boyle's law) of the speed of sound in air, inferred the oblateness of the spheroidal figure of the Earth, accounted for the precession of the equinoxes as a result of the Moon's gravitational attraction on the Earth's oblateness, initiated the gravitational study of the irregularities in the motion of the moon, provided a theory for the determination of the orbits of comets, and much more.

Newton made clear his heliocentric view of the solar system – developed in a somewhat modern way, because already in the mid-1680s he recognized the "deviation of the Sun "in which a unit of heat descending from a body A at the temperature T° of this scale, to a body B at the temperature (T−1) °, would give out the same mechanical effect [work], whatever be the number T. Such a scale would be quite independent of the physical properties of any specific substance.

By:

Mr. C.BARAVI,
FINAL YEAR(MEIEA).

CLOUD INSTRUMENTATION:

The Technology Is Advancing And May Be Closer Than You Think. What Is This Cloud, And What Can It Do For You:

The development of cloud instrumentation that communicates via the Internet is truly a major technological advance, but one that is difficult to comprehend completely without looking at it in context. To help establish that context, we should begin with a short bit of history to help understand why the development of cloud instrumentation is so significant.

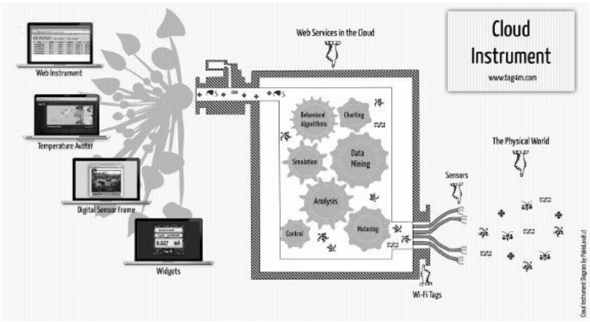

Fig:Cloud Interface.

A cloud instrument will route digitized sensor data packets to dedicated computers located anywhere on the Internet, and they will either use local software or run Web-based programs for computation, simulation, modeling, analysis, and presentation. The following diagram graphically illustrates this concept.

The cloud instrument:

As we try to project how future measurement technologies will look, we must use our intuition as we study the patterns that have enabled such tremendous growth and scale of the Web applications in the last year or so. Within the cloud computing space, the platform companies that are doing well are focusing on new applications in the cloud as opposed to moving existing applications. This applies to test and measurement as well.

Greater adoption by consumers facing applications like environmental monitoring, electricity use, building automation, grid applications, biomedical, spread of diseases, viruses, seismic, hurricane and tornado monitoring, and so forth, will push forward the use case of measurement applications where things that need to be monitored are very dense, wide spread, and Web enabled. For these applications to be possible, we need two critical things:

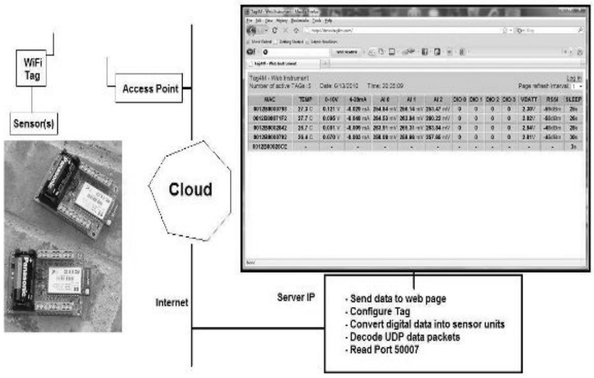

Fig:Interface Dialog Box.

First, sensors and the hardware measurement component must be designed into the fabric of things. Second, the software component must be pushed from local PCs to the cloud for much more processing capability, speed, visibility, and reach. We are currently in the visionary phase of this technology.

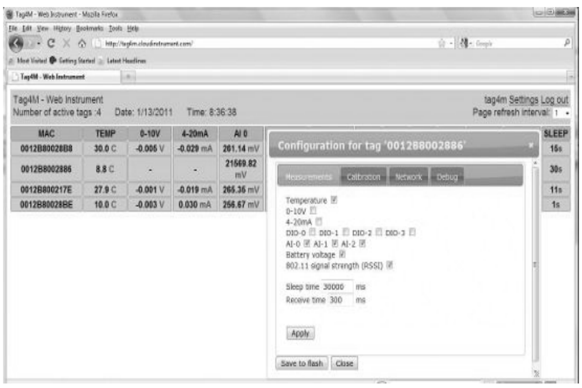

Fig:Cloud Web Page.

A sensor becomes a cloud Instrument when it is connected to a wireless tag such as a Wi-Fi tag. The tag digitizes the data to send it on to an access point, where the data is routed to the Internet and a server IP. Here a customized engine is collecting data to feed into applications like metering, charting, control, analysis, modeling, data mining, and so forth, with display on Web page and Web widget instruments.

In a cloud instrument, one or several sensors are connected to a wireless tag device such as the Tag4M Wi-Fi tag. A digitizer radio chip is required with the following capabilities: very accurate, very small, very low-power, and network enabled with capability to talk to the existing infrastructure. The Tag4M Wi-Fi tag, as seen in the picture bellow, is a prototype fitting with this concept.

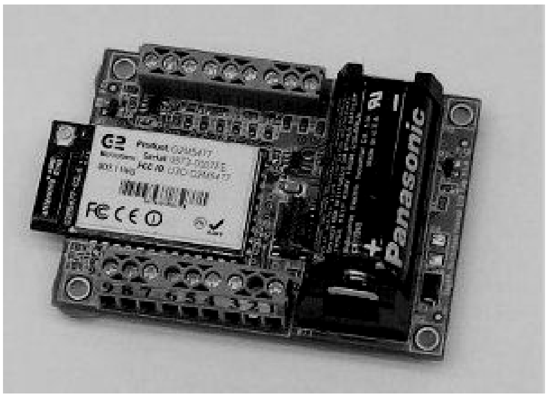

Fig:Wi-Fi Tag.

Such a Wi-Fi tag is a small, battery-powered 802.11b/g device, allowing connections of up to five analog and four digital sensors. The tag digitizes sensor(s) signal(s) and sends data to the nearest Wi-Fi access point which routs the digitized data to the Internet and to a server IP running a tag engine application named Web Page Instrument.

When the tag is powered, it automatically shows up as a Web page instrument. The Web page instrument standard tag display contains the tag MAC, measurement channels, battery voltage, RSSI, and tag sleep time. The Web page instrument will list all the tags that are live and associated with access points all over the Internet.

Limits to cloud instrumentation:

A wireless thermistor is not in itself a cloud instrument. But when you place it in a network with access to the Internet, that simple sensor becomes one. There are two segments of data communication in this setup, the wireless portion that covers communication between the digitizer radio chip and the access point, and the Internet segment.

At the hardware level we need to set open standards that regulate the interface between the radio digitizer chip and the sensor. These standards will open the field for manufacturers to create radio digitizer chips with Internet connectivity that are sensor interchangeable, sensor plug-and-play, and can associate with any off-the-shelf infrastructure access point.

At the firmware level we need to define how we read, digitize, packetize, and send sensor data over wireless in a way that maximizes data security, confidentiality, reliability, availability, and determinism.

By:

Mr.M.DINESH KUMAR,
FINAL YEAR(MEIEA).

ADVANCED INSTRUMENTATION:

Introduction:

The process instrumentation has provided the basic measurement of condition and physical properties that enables process control. The pressure is measured to control pressure, and temperature to control temperature.

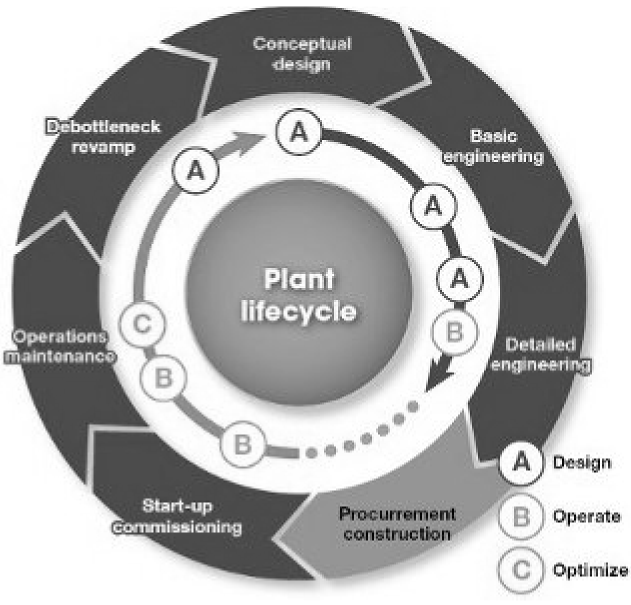

Fig:Flow Diagram of Plant Life Cycle.

The components to get the right product in the right application and build the model code This can work out fine if you are taking only simple condition and product measurements, but recent integrations of advanced process control technology and instrumentation especially flow instrumentation expand significantly the repertoire of strategic measurements that companies can implement. Ignoring these at the design phase can result in lost opportunity to improve processes and ultimately profitability.It could derived by using advanced software to combine readings from all the sensors delivering condition and physical properties, drawing on the same modeling expertise that is used to design the plant.

Safe, cost-effective measurements:

HF alkylation monitoring is a good example of an advanced measurement that can have significant payoff. Hydrofluoric acid (HF) is a common catalyst used in petroleum processing, and accurate analysis of how much HF is recirculating within the process contributes significantly to maximizing the yield rate of crude stock. Early approaches to HF monitoring involved taking manual samples and analyzing them in a laboratory.

A better solution is to replace conventional manual sampling and FTNIR(Fourier transform near infrared) analysis with a measurement system that monitors HF levels in real time by analyzing differential responses from online sensors.Advanced analytical software reads the response spectrum that is directly analogous to the data produced by traditional FTNIR. This measurement and control solution contributes also to maintenance cost reduction by minimizing the potential for corrosion, and supports environment and safety excellence by eliminating any potential sample exposure for plant and laboratory personnel

Irrefutable bunkering transfers:

A combination of Coriolis metering and advanced applications enables irrefutable bunkering transfers. The majority of bunker fuel for world shipping is delivered to ships by barge.

Trapped air, held in suspension within viscous bunker oil, artificially increases its volume.

Advanced digital Coriolis meters have now changed all that. Microprocessors in their transmitters run advanced digital signal processing techniques that provide useful measurements of both mass flow and density, ensuring stable operation in either single- or two-phase flow conditions, such as those found in bunker fuel oil transfer.

Most reservoir models are based on long-term steady-state situations. Oil wells are typically reported on via well tests once a month, whereas gas wells typically report daily averages. Now with real-time measurements, producers can understand well production better and optimize field operations.

Measuring net oil and wet gas:

A new generation of advanced applications extends two-phase flow measurement to multiphase flow measurement, which can enable accurate measure of net oil and wet gas in upstream applications. Currently, most oil and gas fields rely on a gas-liquid separator to measure the output of each well. They separate gas from oil and water to measure the flow rate of each component.

These gas-liquid separators are very expensive to own and operate. They must be supplemented by tanks to store the separated liquids and equipment to enable water re-injection at the site. An operator may also have to pay for a second pipeline for the gathering facility or for trucks to take the condensate off-site, which again requires a lot of hardware, space, and land. Furthermore, these separators can report information daily at best, but optimal reservoir management requires real-time data.

An advanced application involving a Coriolis flow meter uses advanced software to enable measurement of flow containing gas, oil, and water directly from the wellhead without first having to separate them. This delivers huge cost, productivity, and environmental benefits. To measure net oil, a Coriolis flow meter is equipped with an oil and water probe. A remote terminal with an HMI is used to integrate the readings from the probe to an advanced net oil computer (NOC) application.

A new age of instrumentation:

The involvement of flowmeters and the possibility of building a new knowledge base in which data from conventional field devices is combined with applications expertise, modeling, and advanced process control software to enable measurements that could not have even been imagined.

Complexity of business continues to grow, forming clear distinctions between what is simply good know-how and what provides a truly strategic advantage is becoming more difficult. The challenge for automation vendors is to apply that knowledge to help customers achieve excellence in control, asset management, productivity, and environmental challenges.

By:

Mr. P.SENTHIL KUMAR,
LECTURER/EIE.

INFRARED TOY CAR MOTOR CONTROLLER:

This add-on circuit enables remote switching on/off of battery-operated toy cars with the help of a TV/ video remote control handset operating at 30–40 kHz. When the circuit is energized from a 6V battery, the decade counter CD4017 (IC2), which is configured as a toggle flip-flop, is immediately reset by the power-on reset combination of capacitor C3 and resistor R6. LED1 connected to pin 3 (Q0) of IC2 via resistor R5 glows to indicate the standby condition. In standby condition, data output pin of the integrated infrared receiver/demodulator (SFH505A or TSOP1738) is at a high level (about 5 volts) and transistor T1 is 'off' (reverse biased).

The monostable wired around IC1 is inactive in this condition. When any key on the remote control handset is depressed, the output of the IR receiver momentarily transits through low state and transistor T1 conducts. As a result, the monostable is triggered and a short pulse is applied to the clock input (pin 14) of IC2, which takes Q1 output (pin 2) of IC2 high to switch on motor driver transistor T2 via base bias resistor R7 and the motor starts rotating continuously (car starts running). Resistor R8 limits the starting current.

When any key on the handset is depressed again, the monostable is retriggered to reset decade counter IC2 and the motor is switched off. Standby LED1 glows again. This circuit can be easily fabricated on a general-purpose printed board. After construction, enclose it inside the toy car and connect the supply wires to the battery of the toy car with right polarity. Rewire the DC motor connections and fix the IR receiver module in a suitable location, for example, behind the front glass, and connect its wires to the circuit board using a short 3-core ribbon cable/shielded wire.

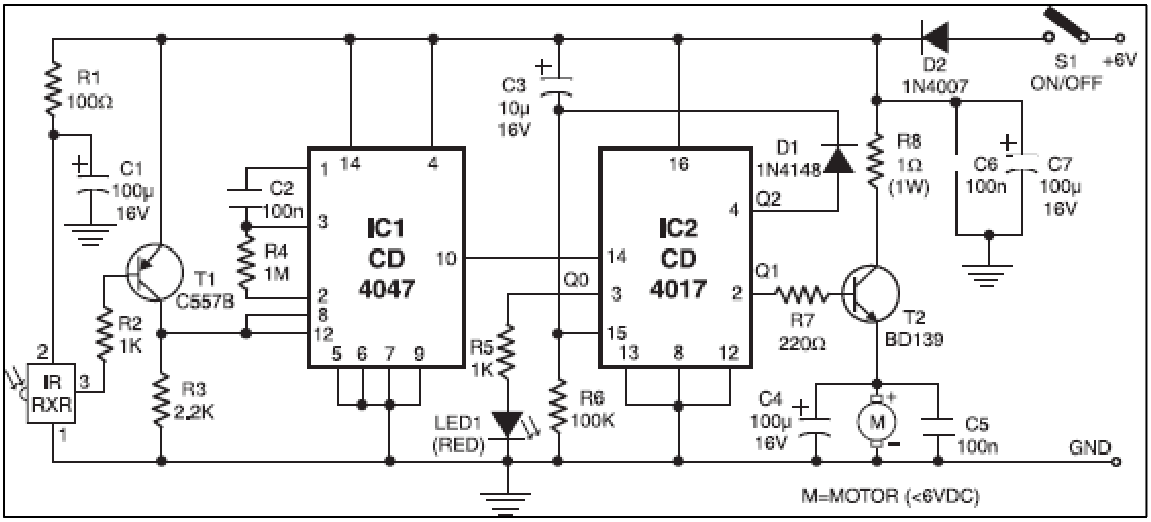

Fig: Circuit Diagram of Infrared Toy Car Motor Controller

Reference:www.efy.com

By:

Mr.C.SIVA,
FINAL YEAR(MEIEA).

XOS 2 NEW GENERATI ON EXOSKELETON GADGET:

The American defense manufacturer that focuses on the development on defense systems and defense electronics, Raytheon, has recently demonstrated its latest invention - second generation exoskeleton. Dubbed XOS2, the robotic suit is more lightweight, faster and stronger compared to its predecessor XOS 1. In addition, the new exoskeleton consumes less power.

It is worth mentioning that the company's latest invention allows its wearer to lift 200 pounds hundreds of times and not get tired. Developed for the U.S. Army, the suit also allows the user to punch through 3 inches of wood.

Fig:Exoskeleton Gadget.

Besides being durable and increasing the wearer's power, the robotic suit is agile and graceful enough to allow the user to easily kick a soccer ball or climb stairs.

BUILDING A HUMAN ON A CHIP, ORGAN BY ORGAN:

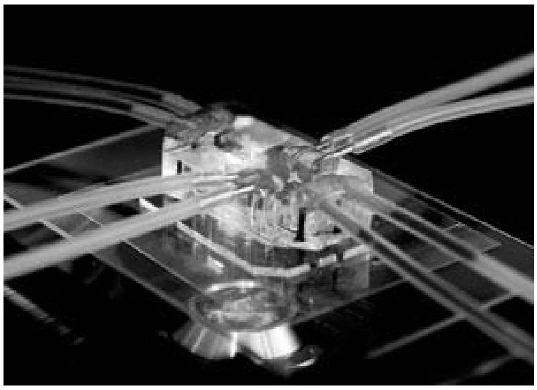

Fig:Organ Chip.

Human "organs on chips" could be linked to make the ideal guinea pig, revolutionizing the way drugs are tested and cancer is treated.

It is a small sample taken from a mouse and held in a "brain-on-a-chip" device: the tissue is suspended between two layers of plastic and surrounded by a nutrient-rich fluid.

The brain is just the latest internal organ to be replicated in miniature form. From beating hearts to breathing lungs, livers to fallopian tubes, the list is continually growing. Williams and others at last month's symposium are trying to figure out ways to connect some of these chips together - a step towards creating a body-on-a-chip

By:

Mr. P.EZHILARASU, FINAL YEAR(MEIEA).

MILITARY SENSORS:

LEVEL SENSORS:

Gill liquid level sensors are lightweight, accurate and, more importantly, reliable. The sensors use capacitive technology with no moving parts and have integral electronics.

Fig:M-series UAV Level sensor.

M-Series UAV Level Sensors:

This type of sensor is available in a miniature oil reservoir sensor or extra-long submersible fuel level sensor.

R-Series UAV Level Sensors:

The R-Series sensor is standard sensor design, with 5-bolt SAE flange design. This range is available at any custom length (to 1.5m) for both fuel and oil applications.

Fig:R-series UAV Level sensor.

Specialist military vehicles are often subject to extremely harsh environments where vibration, impact and temperature extremes are present. These level sensors have been designed to cope with the most demanding of these challenges and can be relied to perform all the application or terrain.

VIEW SENSORS:

Fig:Liquid Level Displays.

The LED Liquid Level Display has been introduced to provide an accurate display of liquid level information in real-time. The gauge is available for most liquid types and is compatible with all Gill liquid level sensor products.

The display has been designed with special features including fully configurable scaling, adjustable electronic damping and a fully adjustable low level warning indicator. Additional features include auto-dimming control and multi-colored LEDs ensuring this device can be seen in all lighting conditions

POSITION SENSORS:

Fig:Military Vehicle Position Sensors.

It offers a range of 'standard' position sensor products for linear, rotary and angular measurements. All products are solid-state with no moving sensor parts - ideal for pedal, suspension and pneumatics applications where high dither life is essential.

Using the same patented induction technology, we can design bespoke position sensor products to meet the exact requirements. Current projects examples include non-contact brake wear measurement and gearbox shift-fork position measurement.

CUSTOM DIFFERENTIAL HALL-EFFECT SPEED SENSORS:

Fig: Hall Effect Speed Sensor.

Gill Speed Sensors use a dual element "Hall Effect" device to detect changing magnetic fields in the presence of a toothed ferrous metal target wheel. Tried and proven in F1 championship gearboxes, our speed sensors are suitable for either gearbox or wheel speed sensing. With robust fully encapsulated constructions, unique internal designs and sealing methods, the sensors may be fully immersed in oil at high temperature without reduction in performance.

Fig: 360º Blade Rotary Sensor.

The Gill 360º Blade Rotary Sensor is a solid-state inductive rotary position sensor, capable of measuring a full 0-360º. The sensor uses Gill's patented induction technology to sense the position of a metallic 'activator, mounted to the moving object.

The 360º Blade Rotary Sensor has no moving parts and also has no contact between the sensor and the moving part of the application, the sensor will not suffer from mechanical wear through use. Blade Rotary Sensor is ideal for applications subject to harsh environments.

Multiple outputs are available as standard, including Analogue (0-5.5V), Switch, PWM and Serial. The output can be fully configured using the supplied BladeCOM software, allowing the full-scale output to be used over a smaller measurement range.

By:

Mr.M.MANIKANDAN,
FINAL YEAR(MEIEA).

PARAMETERS FOR SELECTION OF BOILERS:

Introduction:

Steam Boiler is very important equipment for all process industries. There are many codes in use for design of boilers internationally. All these codes mainly take care of safety aspects of boilers from angle of mechanical strength. Some codes stipulate norms for furnace sizing on thermal input basis.

Fig:Horizontal Boiler.

Safety and Reliability:

Apart from mechanical strength, it is the control logic and instrumentation, which decides safety and reliability of any modern boiler. Some of the important aspects are discussed below.

Number of boiler water level controllers:

Keeping proper water level in the boiler is of paramount importance from boiler safety point of view. This instrument not only maintains necessary operating water level by controlling the water inflow, but also ensures burner stoppage in case of the level falling below safe limit. It is advisable to have two instruments considering the criticality of the function.

Number of fusible plugs:

Fusible plug avoids dry running of a boiler by sparing high-pressure water in the furnace when water level goes below the topmost area of radiation heat transfer zone. This is the ultimate safety device, which can save furnace from collapse and rupture due to dry running.

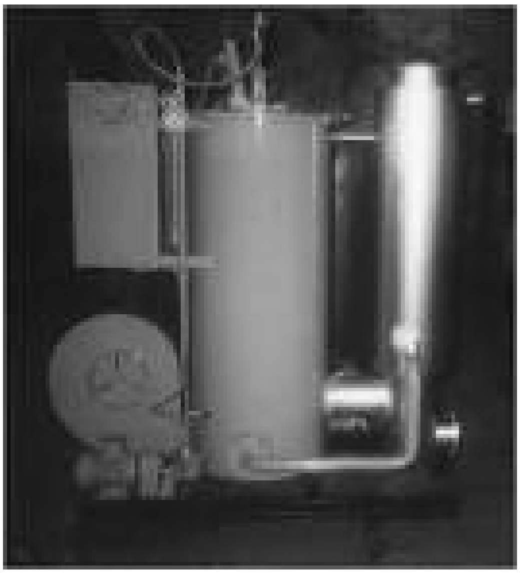

Fig:Vertical Boiler.

Tube overheat controller:

This works as an overriding control in case the water level controller does not function and the burner keeps operating inspite of very low water level. It senses the temp of flue in the topmost row of tube. When the level drops down, this row gets exposed and flue gas temp in these tubes rises much higher than the bulk temp. In such eventuality, this controller sounds an alarm and can also stop the burner depending on the logic.

High stack alarm controller:

The stack temp is an indicator of fouling of heat transfer surfaces in the boiler from flue & waterside. This not only results into higher fuel consumption but also overheating of tubes and furnace (in case of waterside fouling). This instrument sounds an alarm in such conditions, cautioning the operator to clean the surfaces.

Sinking time calculation:

Sinking time is the time required to lower the water level in the boiler from normal working level to the furnace crown when the feed water pump fails and burner keeps firing at high flame due to failure of all safety devices.

Fuel pressure monitoring system:

Most of modern oil fired boilers use pressure jet burners. It is necessary to maintain fuel pressure above the minimum desired limit to ensure atomization of fuel and complete combustion. Fuel pressure sensing system should be provided for tripping the burner in case the fuel pressure falls below the safe limit.

Fuel temperature monitoring system:

For heavy oil fired boilers, the fuel needs to be heated to reduce viscosity and improve atomization. Low fuel temp can result in incomplete combustion, unstable flame and backfiring. Fuel temp monitoring system should stop the burner firing below safe temp.

Combustion air pressure monitoring system:

This will ensure availability of air for combustion. Unavailability/ shortage of air results in similar situations mentioned above. The burner should trip automatically in case in case air is not sufficiently available.

Steam pressure modulation:

High-low or step modulation adjusts the fuel in stages. Stepless modulation can maintain steam pressure on the boiler within a tolerance of 0.1 – 0.2 kg/ cm2. With step or high-low type of modulation, you can expect variation of 1.0 to 1.5 kg/ cm2.

Steam pressure limit switch:

If the steam demand drops to a very low level, the steam pressure rises in spite of burner firing at minimum possible level. Steam pressure limit switch cuts off the burner and eliminates possibility of safety valve popping up, saving precious fuel.

Safety valves:

Safety valves release steam without any need for electronic signal from instruments. This is a very important device and is a must as per all codes. The release capacity should be more than that of the steam generation capacity of boiler

- - - - - -TO BE CONTINUED- - - - - -

By:

Ms.A.PRIYANGA,
FINAL YEAR(MEIEA).

TECHS & APPS:

1) A box of 150 packets consists of 1kg packets and 2kg packets. Total weight of box is 264kg. How many 2kg packets are there?

Sol) x=2kg Packs,y=1kg packs
x + y = 150 ....eq1
2x + y = 264 ....eq2
Solve the Simultaneous equation;x = 114so,y=36
Ans: Number of 2 kg Packs = 114.

2) My flight takes of at 2am from a place at 18N 10E and landed 10 Hrs later at a place with coordinates 36N70W. What is the local time when my plane landed?
6:00 am b) 6:40am c) 7:40am d) 7:00am e) 8:00am

Sol) the destination place is 80 degree west to the starting place. Hence the time difference between these two places is 5 hour 20 min. (=24hr*80/360).
When the flight landed, the time at the starting place is 12 noon (2am + 10 hours).
Ans: Tthe time at the destination place is 12 noon - 5:20 hours = 6: 40 am.

3) A plane moves from 9°N40°E to 9°N40°W. If the plane starts at 10 am and takes 8 hours to reach the destination, find the local arrival time ?

Sol) Since it is moving from east to west longitide we need to add both ie,40+40=80
multiply the ans by 4 =>80*4=320min
convert this min to hours ie, 5hrs 33min
It takes 8hrs totally . So 8-5hr 30 min=2hr 30min
So the ans is 10am+2hr 30 min
Ans: At 12:30p.m. it will reach.

4) A fisherman's day is rated as good if he catches 9 fishes, fair if 7 fishes and bad if 5 fishes. He catches 53 fishes in a week n had all good, fair n bad days in the week. So how many good, fair n bad days did the fisher man had in the week?

Sol) Go to river catch fish
4*9=36
7*1=7
2*5=10
36+7+10=53...
take what is given 53
good days means --- 9 fishes so 53/9=4(remainder=17) if u assume 5 then there is no chance for bad days.
fair days means ----- 7 fishes so remaining 17 --- 17/7=1(remainder=10) if u assume 2 then there is no chance for bad days.
bad days means -------5 fishes so remaining 10---10/5=2days.
Ans: 4 good, 1 fair, 2bad. total 7 days.
x+y+z=7---------eq1
9*x+7*y+5*z=53-------eq2
multiply eq 1 by 9,
9*x+9*y+9*z=35-------------eq3
from eq2 and eq3
2*y+4*z=10-----eq4
since all x,y and z are integer i sud put a integer value of y such that z sud be integer in eq 4 and ther will be two value y=1 or 3 then z = 2 or 1 from eq 4
for first y=1,z=2 then from eq1 x= 4 so 9*4+1*7+2*5=53.satisfied
now for second y=3 z=1 then from eq1 x=3 so 9*3+3*7+1*5=53.satisfied
so finally there are two solution of this question (x,y,z)=(4,1,2) and (3,3,1).

By:

Mr. K.MOHAN DASS,
FINAL YEAR(MEIEA).


Collection of mistakes
is called experience,
Which leads to
success...