# TAMILNADU SAFETY

# PROFESSIONALS

# WELFARE ASSOCIATION

# PRESIDENT'S DESK

**Dear Members of TNSPWA**,

I am happy & delighted to release the quarterly e-Magazine of our great association. This quarter, we have two excellent and very useful articles written by our Members.

**ARTICLE 1 : CARBON FOOT PRINT** – Written by **Sri.X.V.Manohar/Jt.Secretary of TNSPWA** .
Green house gases are emitted from all industries, automobiles due to burning of Fossil fuels, Deforestation and various other activities which Humans are carrying day in day out. Due to Green House Effect - Global warming, increasing the earth's temperature, Land, Air & Water pollution, further leading to various diseases and illness. United Nation's Environment Program thro' various conferences & consultations have come out with many initiatives & innovations to reduce the Green house Effect. India has taken the lead and made lot of developments in Renewable energies, Environment protection etc.

**ARTICLE 2 : SHOCK FREE ENVIRONMENT IN INDUSTRIES DOING MMA WELDING PROCESS** – Written by **Sri.S.Ilamaran/CSO/S.Railway** , one of our Member.

It is one of the very useful article on Electrical Safety. Protection from Electrical shock is a major challenge in all industries, where lot of fatalities occurs every year due to electric shock in industries & domestic areas. The article brings out how electric shock occurs and the Physiological changes in Human body due to Electric shock, which is very clear to understand by all.

On behalf of TNSPWA, I thank both the Authors for bringing out 2 varied & very useful articles in this quarterly E-Magazine.

I also thank Sri.V.Narasimhan, one of our member & a Senior HSE professional in the country, for delivering a knowledge sharing session on Process Safety Management.

TNSPWA encourages all Members to actively participate in such Knowledge sharing initiatives to improve further career progression in HSE Field
.
I request all Members to bring more Safety Professionals to this great association to strengthen TNSPWA, so that our foundation will be very strong to serve all Safety Professionals.

I take this opportunity to wish all Members, their families & their Industry workers and the Organization where they work, all the best in the year ahead and always.

Wishing you all to keep good health & Safe work place.

With Best Wishes.
**R.Mohan**
**President/TNSPWA**

# SECRETARY MESSAGE

**Dear TNSPWA members,**

## Greetings:

**1.Carbon foot print & Greenhouse Gases** – Topic is need of the hour

This E book clearly explains about major contributors of Greenhouse gases & Carbon foot print and proactive measures required in reducingCarbon foot print &reduction inGreenhouse gases.

Reducing Carbon foot print &Green House Gas Emissions – Reverse the impact of Global warming, improve air quality &Saves Lives

**2.Make Electrical Hazard free environment while doing MMA welding process in big industries.**

Electrical accidents in welding process are mainly due to supply insulation failure or improper earth connection in welding plant. But this kind of electrical accident can be avoided by providing any earth leakage devices like RCCB.

This is 100 % required to save human life especially in MMA Welding process in the heavy industry **- Avoid electric shock/burns.**

Our Joint Secretary Mr.X. Velanganni Manohar Senior Manager – EHS ZF CVS India Limited and Mr.Ilamaran, Chief Safety Officer/Electrical and industry Expert - Southern Railway releases this Quarterly E magazine which includes two key topics:

1. “Carbon foot print & Greenhouse Gases”
2. “Make Electrical Hazard free environment while doing MMA welding process in big industries”.

The first topic will be helpfulin reducing Green House Gas Emissions at various industries and in our personal life.The second topic will be helpful in preventing incident/accident at workplace in heavyindustries.

Everyone shall read this E magazine and spread **“Safety, Environment& Health”**awareness tocolleagues, friends and family members so that we can save the society.

**K. Palani**

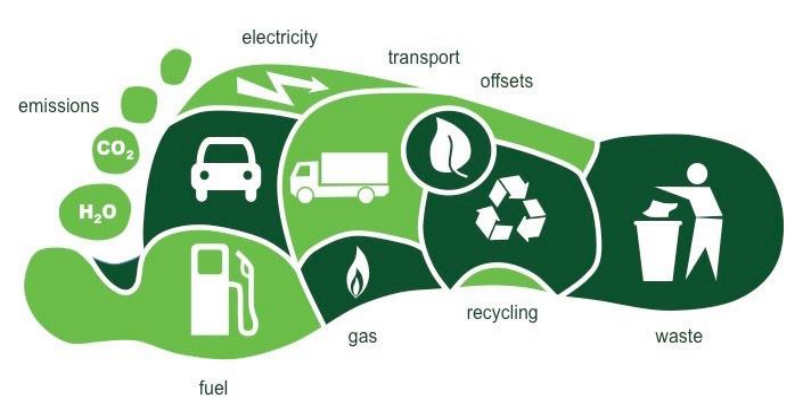
**Secretary/TNSPWA**

**X.Velanganni Manohar Senior Manager - EHS**
**ZF CVS India Limited**
**Joint Secretary – TNSPWA**

## Introduction :

With immense pleasure I take this opportunity to share this news letter on Carbon foot print- Total Greenhouse Gas (GHG). GHG emissions caused by an individual, event, organization, service, place or product expressed as Carbon dioxide equivalent ($CO_2e$).

## CARBON FOOTPRINT

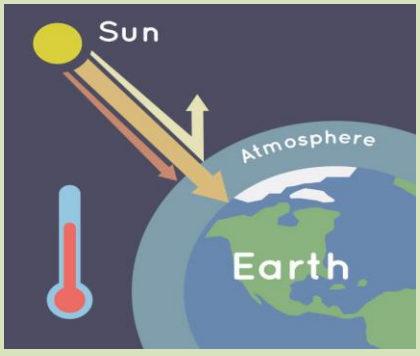



## Greenhouse Gas:

A carbon footprint is the total amount of greenhouse gases (including carbon dioxide and methane) that are generated by our actions.

Carbon containing gases are emitted through burning of fossil fuels, land clearance and the production and consumption of food, manufacturing, materials, wood, roads, buildings, transportation and other services.

As $CO_2$ soaks up this infrared energy, it vibrates and re-emits the infrared energy back in all directions. About half of that energy goes out into space and about half of it returns to Earth as heat, contributing to the Greenhouse effect.



**The major causes of the Greenhouse Effect are:**

- Burning of Fossil Fuels. Fossil fuels are an important part of our lives. ...
- Deforestation. ...
- Farming. ...
- Industrial Waste and Landfills. ...
- Global Warming. ...
- Depletion of Ozone Layer. ...
- Smog and Air Pollution. ...
- Acidification of Water Bodies.

**The average carbon footprint for a person, Globally the average is closer to 4 tons.**


India is the third largest emitter of greenhouse gases and accounts for 2.46 billion metric tones of carbon or 6.8% of the total global emissions. The average carbon footprint of every person in India was estimated at 0.56 tonne per year – with 0.19 ton per capita among the poor and 1.32 ton among the rich.

The major contributors to Carbon Footprints are:

**Food consumption, transportation and household energy.** Food is the major contributor to carbon foot prints and meat in particular is an issue. Livestock is responsible for a significant amount of greenhouse gas emissions, and beef is one of the biggest contributors.

**Food accounts for 10 – 30 % of a household's Carbon Footprint**, typically a higher portion in lower-income households. Production accounts for 68% of food emissions while transportation accounts for 5%.

**Transportation (27% of greenhouse gas emissions) –** The transportation sector generates the largest share of greenhouse gas emissions. Greenhouse gas emissions from transportation primarily come from burning of fossil fuel for our cars, trucks, ships, trains and planes. Over 90% of the fuel used for transportation is petroleum based which includes primarily gasoline and diesel.

**Electricity production(25% of greenhouse gas emissions)** – Electric power generates the second largest share of greenhouse gas emissions. Approximately 60% of our electricity comes from burning fossil fuels, mostly coal and natural gas.

**Industry (24% of greenhouse gas emissions) –** Greenhouse gas emissions from industry primarily come from burning fossil fuels for energy, as well as greenhouse gas emissions from certain chemical reactions necessary to produce goods from raw materials.

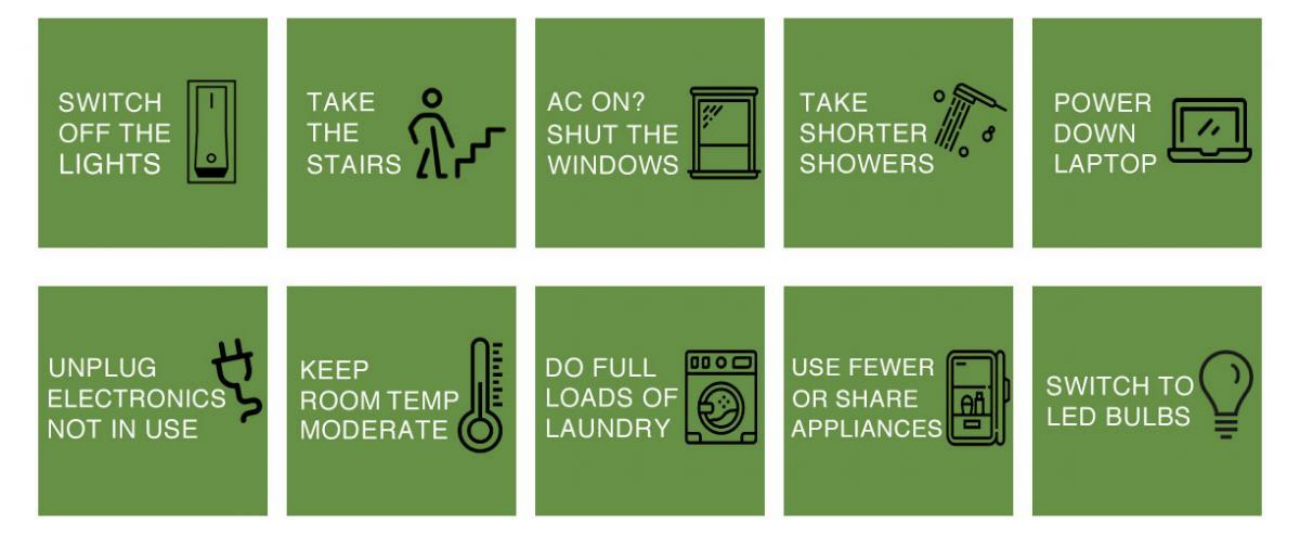
**Commercial and Residential (13% of greenhouse gas emissions)** – Greenhouse gas emissions from business and homes arise primarily from fossil fuels burned for heat, the use of certain products that contains greenhouse gases and the handling of waste.

**Agriculture (11% of greenhouse gas emissions)** – Greenhouse gas emissions from agriculture come from livestock such as cow, agricultural soils and rice products.

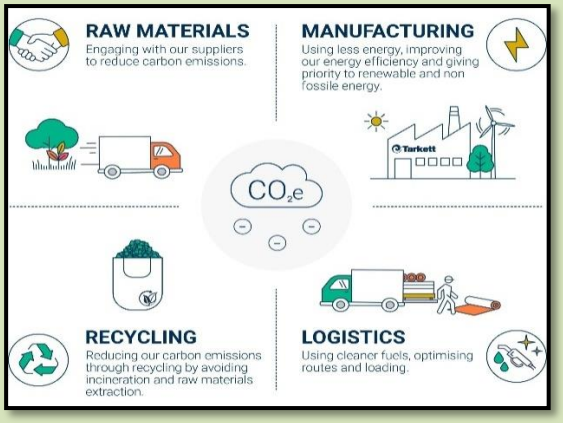
**Land use and Forestry (13% of greenhouse gas emissions)** – Land areas can act as a sink (absorbing $CO_2$ from the atmosphere) or a source of greenhouse gas emissions. In the United States, Since 1990, managed forests and other lands are a net sink, i.e., they have absorbed more $CO_2$ from the atmosphere than they emit.

**Carbon footprint reduction**

As a individuals and corporations can take a number of steps to reduce carbon footprints and thus contribute to global climate mitigation. Purchase carbon offsets (broadly stated, an investment in a carbon reducing activity or technology) to compensate for part or all of their carbon footprint. If purchase enough to offset their carbon footprint, become effectively carbon neutral.




**Carbon footprints can be reduced through energy efficiency and changing lifestyles and purchasing habits**.



- ✓ Switching one's energy and transportation use can have an impact on primary carbn footprints, Example,
    - Using public transportation, such as buses and trains, reduces an individual's carbon footprint when compared with driving
    - Installing energy efficient lighting LED lights,
    - Using renewable energy sources to generate the electricity
      Example:
        - Wind power produces no direct carbon emissions
        - Solar power generation
    - Monitoring energy and reduce the usage year over year
    - Reduce and Rethink the Transportation
    - Use the 5 R Principle and reduce the wastages.

**Conclusion:**

As you are aware many organizations have already signed up for the Climate Pledge in Paris Agreement, an initiative designed to establish net Zero Carbon emissions in coming decades.

As a responsible EHS professionals we need to promise to facilitate achieving Net Zero Goals by energy efficiency and Sustainability initiatives as a individual and as a organization to reduce the carbon emissions helps to reverse the impact of global warning.

**" Reducing Greenhouse Gas Emissions Save Future Lives "**

I feel wonderful, Thank you for the opportunity to write the news letter in the TNSPWA E-magazine and I wanted to thank you for taking the time to read the news letter.

**S.Ilamaran**
**Chief Safety Officer/Electrical,**
**Southern Railway.**

# Make shock free environment while doing MMA (Manual Metal Arc) welding process in big industries

It is general presumption that Electrical accidents in welding process is due to main supply insulation failure or welding plant not properly connected to general mass earth. But this kind of electrical accident can be avoided by providing any earth leakage devices like RCCB. But in large industries or welding operation carried out in large vessels, carriages have different kind of electrical accidents i.e. exposure of welder body parts to welding supply which leads to electric shock and this cannot be prevented by installing earth leakage devices like RCCB. Further this kind of electric shock the welder may not feel the severe pain of shock and current entry point and current exit point cannot be found out.

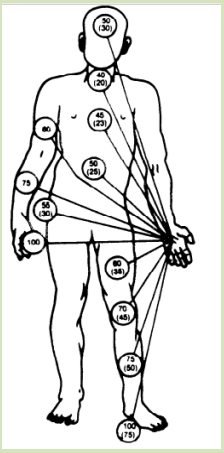
Then how this welding supply will hurt the welder and safety gadgets to be used to avoid this kind of electrical accidents are discussed here. In the morning while starting the welding operation same welder touch the welding supply for connecting the welding lead may not feel the electric shock even the welding plant is 'ON'. Reason is the body impedance plays the roll i.e. in the morning or start of the work his perspiration was almost nil. Then the welder become active and proper ventilation is not there perspiration will increase and his body impedance will come down.

Normally MMA welding plants has the maximum Voltage **80 V** (During open circuit condition) i.e. when welder is not doing welding and as per BIS specification 1851 – 1997 rated output open circuit voltage is 80 V.

While welding the voltage will be according to welding current

| Welding current in Amps | Corresponding voltage during welding |
|---|---|
| 150 | 26 |
| 200 | 28 |
| 300 | 32 |
| 400 | 36 |
| 500 | 40 |
| 600 | 44 |

During welding according to welding current the voltage will vary as shown above table. From this maximum voltage at welding plant is 80 V. This 80 V will give electric shock that too fatal for welder or the high welding current is dangerous for welder?



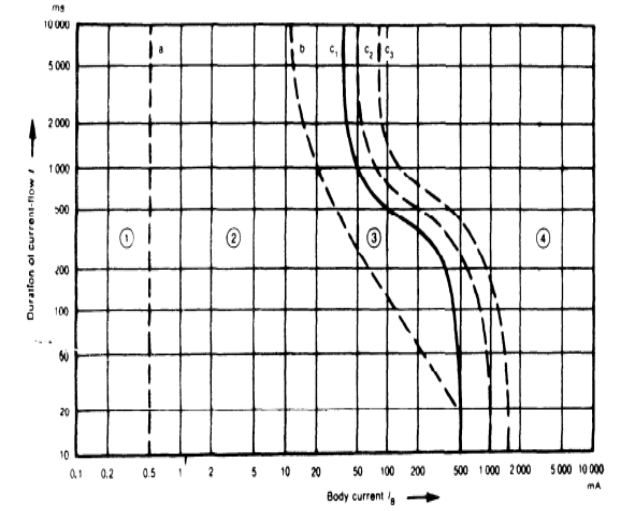
But vital variable data which plays crucial role here is human body impedance . Normally human body impedance would be taken as 100 % between hand to hand as shown in figure. Impedance shown on other parts are expressed in percentage of impedance from one hand and in figure in bracket refers to percentage of impedance from both hands to that part in question. This body impedance varies with

1. Applied voltage
2. Amount of Perspiration

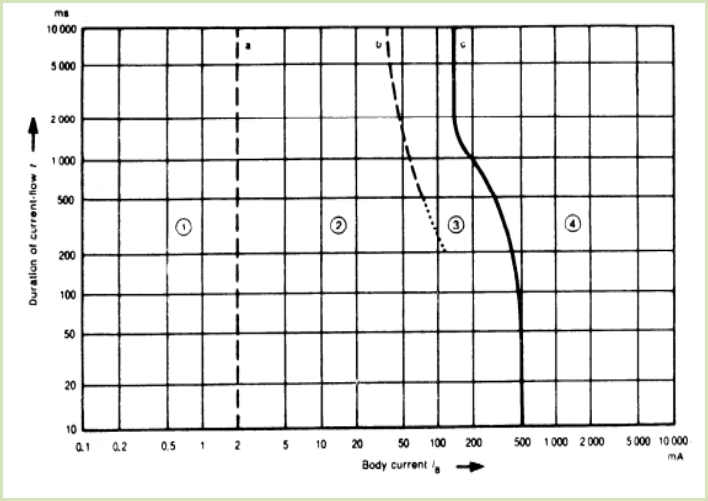
From this either increased voltage or decreased impedance of welder body will increase the flow of disturbing current through the body as we know Current I =Voltage (V)/Resistance (R). Here in MMA welding plant maximum voltage exposure to welder is 80V i.e. open circuit voltage of can pump 20 mA if the welder body impedance 4000 & 30 mA if body impedance is 2666. Even this 20 mA gives current impulse in the heart if the welder exposed for one second if he is exposed for alternating current. In case of DC supply, it will have lesser effect i.e. 50mA is required to create the same effect. But both are dangerous.

Physiological change in human body is increases with amount of current flowing through the body and duration of exposure to the current is given in detail in BIS spec 8437 -1992 as tabulated here. Here Zone 3 and Zone 4 are dangerous and human body shall not be exposed that zone

| | **Physiological change** |
|---|---|
| Zone 1 | No reaction effects |
| Zone 2 | No harmful physiological effect |
| Zone 3 | Increasing with current impulse in the heart likely |
| Zone 4 | Ventricular fibrillation |




**For AC current**




**For DC current**

From the above figure Welder will have severe Physiological change due to electric shock effects by AC current welding machines than DC current welding machine i.e. In AC welding machines the current passing through welder starts giving severe effects even from 10 mA . But in DC welding machines this effect starts from 35 mA.

Welder will have high probability of exposure when welding process is carried out in large vessels, structures, containers, wagons and coaches. So following solution may be adopted as engineering control to eliminate this hazrd.

**Solution to avoid this electric shock incident**

Though the welder wears all PPE, his exposure to the job is more since he stand on the job and carry out welding and the PPE he wore will increase the perspiration which is inducing factor for this kind of accidents. So engineering control for this hazard is essential i.e. using welding plants fitted with **VRD (Voltage reducing device**) which is very useful in bringing the open circuit voltage to safest level i.e. from 80 V to (10 – 15) V as soon as the welder remove the holder from the job. In this type of welding machines, the welder is not all exposed for harmful voltages so exposure to hazardous voltage is totally eliminated.

**As part of our Association activities, A Knowledge sharing webinar was aarranged on "PROCESS SAFETY MANAGEMENT – SPEAKER – VENKATACHARI NARASIMHAN**

On a fine day 17.07.2022, TamilNadu Safety Professionals Welfare Association (TN-SPWA) organized a knowledge sharing webinar on "Process Safety Management". The session was inagurated with a welcome note by Mr TR Murali – Vice President (TNSPWA) and speaker introduction was given by Mr S Arunkannan – Executive committee member – TNSPWA. The session started at 11.00 AM and ended up at 12.30 PM.

Mr. Venkatachari Narasimhan a qualified chemical engineer and process safety expert who is having 50 years of professional experience worked as senior executive – operations in coromandel international limited. The webinar was useful for near about 100 participants.

The following topics are covered such as

The Process safety management

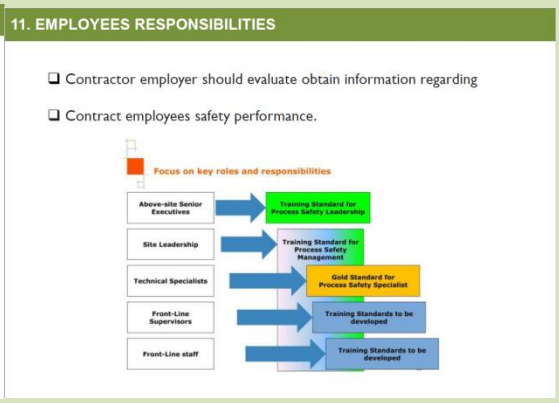
Process safety information

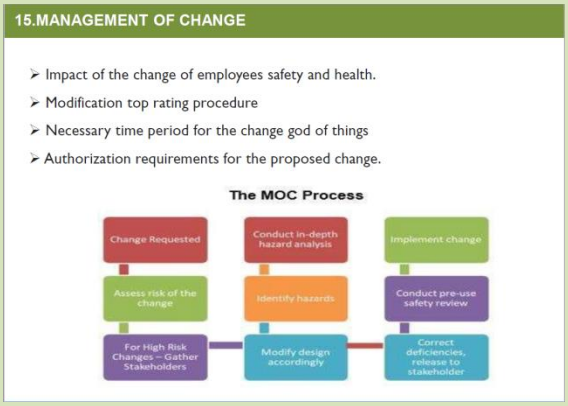
Process Hazard analysis

Employees responsibility

Pre start up safety review, MOC,

Mechanical integrity, Etc.,


The session was helpful for the safety professionals who have participated and this event is organised for mutual benefit of the members and non-members on free of cost.

At the end of session conclusion, vote of thanks was given by Mr TR Murali – Vice President – (TNSPWA)

| | |
|---|---|
| TotalAssociationmembersasonApril2022 | 278 |
| Professionalmembers | 214 |
| Corporate/VendorMembers | 16 |
| Studentmembers | 48 |

**SLOGAN OF THIS ISSUE**

**PREPARE AND PREVENT**

**INSTEAD OF**

**REPAIR AND REPENT**

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