Fundamental of Welding Science and Technology

Dr. Pankaj Biswas
Department of Mechanical Engineering
Indian Institute of Technology, Guwahati

Lecture – 08
Welding Power Sources Characteristics

Last class, actually I completed the different categories of power sources especially last class I have completed the static characteristics of different Welding Power Sources. Today, I will first make a comparison between this static characteristic power sources like constant current and constant voltage characters, what is the comparison or difference between them then I will go for dynamic characteristics of power sources.

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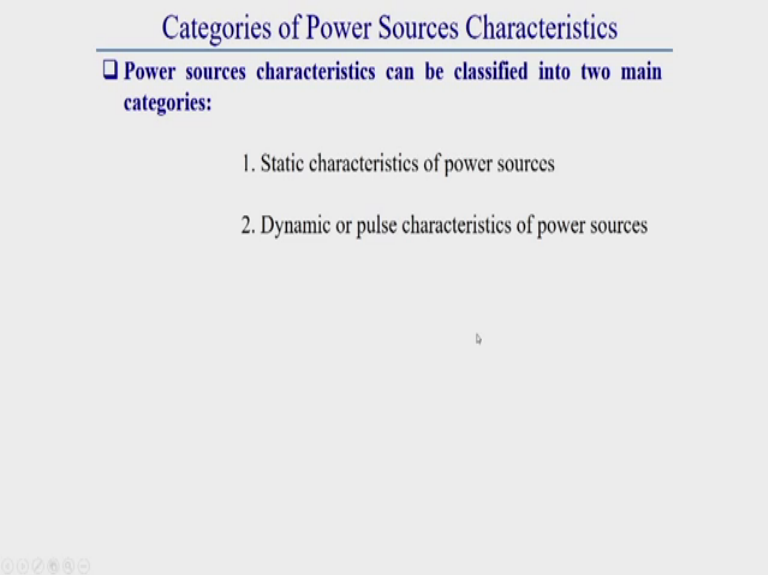

So, first of all last class actually I have already told you that there is generally two different types of power sources. Last class I have completed on static characteristics power sources, that is, there we have seen there is generally three different categories of a static characteristics power sources – one is constant current CC, another one is constant voltage and another last one is combined characteristics power sources.

In this next categories is remain which is called dynamics or pulse characteristics of power sources. In this I will discuss in details in today's lecture. Before going to discuss about dynamic characteristics or pulse characteristics of power sources first of all I will just briefly discuss about the comparison between constant current characteristics power

sources and constant voltage characteristics constant voltage characteristics power sources.

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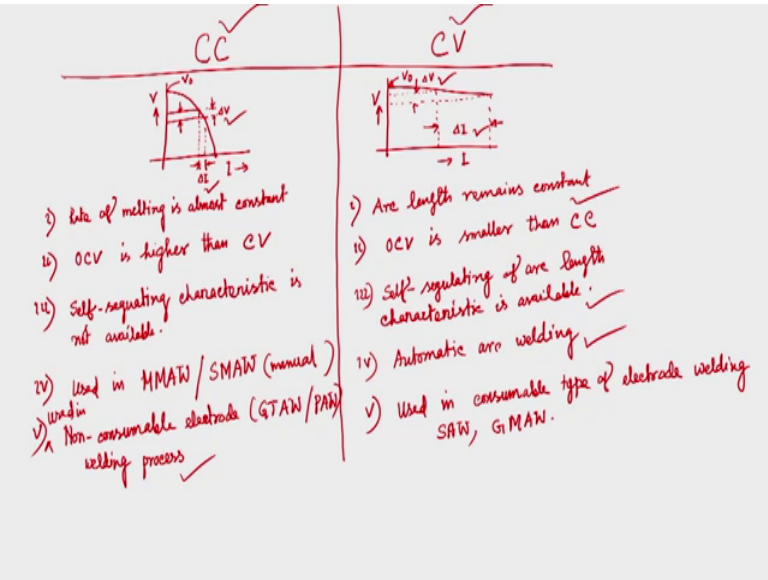

So, for that generally I will just briefly discuss about this things. So, generally constant current CC it is represented constant CC and constant voltage is represented as constant voltage. So, what is the comparison or differences between these two? First of all we will discuss briefly here after that we will go to dynamic characteristics of power sources.

Generally constant characteristics power source is look like a constant characteristic power source curve is look like this. This is also called drooping characteristics and constant voltage characteristic power sources is look like or voltage is remains almost constant voltage is remain almost constant.

Now, here generally this point is called V 0 or you can say this is generally called open circuit voltage of the power source. Now, from this two power sources what we can observe? Here a small change of voltage a small change of voltage means a small change of arc length; that means, if here a small change of voltage is occur; that means, that the voltage is delta V here generally a small change of current is occur.

Here generally here generally change of current is a small whereas, here generally in this case for flood characteristics or constant voltage characteristic power sources here generally for a small change of a; small change of voltage like this delta V here generally

current change is change of current is comparatively very high as compared to constant current power source characteristics.

So, what are the difference between these two characteristic power sources? Here generally rate of melting is almost constant; is almost constant, but here in this case rate of melting can vary arc length remain arc length remain remains constant. How we can observe from here because you see here a small decrease of voltage here a small decrease of voltage a small increase of current is occur whereas, here generally a small decrease of voltage large change of current is occur.

So, here generally melting rate is not constant, but here generally if the arc length changes then here generally due to this more melting here arc length remain constant in case of constant voltage power source characteristics.

Second thing here in case of constant voltage power sources OCV, that means, Open Circuit Voltage, is higher than constant voltage power source, here open circuit voltage is comparatively a smaller than constant current power source characteristics. Now, here third point is self regulation self regulating characteristics characteristic is not available; is not available; that means, if here generally self adjustment of arc length is not available. That means, if the arc length change that arc length remain more or less same, but here generally self regulating of arc length characteristics of is available self regulating of arc length characteristics is available.

So, here generally arc length if there is a change of arc length in case of constant voltage power sources here generally if there is a constant in case of constant voltage power source if there is any shortage of arc length is there. Then there will be a shortage of voltage due to this small shortage of voltage there will be comparatively high change of current is there or high increment of current is there due to that generally more melting of (Refer Time: 07:26) is taken place. So, what happens here this arc generally length regain to its original position this is generally called self regulating of arc length characteristics this is available in constant whatever the constant current this is not available.

Generally is this constant current power source characteristic used in Manual Metal Arc Welding MMAW or we can say this is also called SMAW generally manual welding process generally this is used and generally this is used in automatic arc welding process;

automatic arc welding process. Generally this constant voltage power source characteristics is more applicable. Because here generally if there is a constant automatic power source generally if there is a constant here generally we can maintain constant feed rate of consumable (Refer Time: 08:38). In case of constant voltage power source characteristics because generally here self regulating characteristics is available that is why it is used generally in automatic arc welding process. It is generally used for manual arc welding process manual welding process is generally used for manual welding process.

This is also used for non consumable electrode; non-consumable electrode that is GTAW or plasma arc welding process where generally non-consumable electrode is used non-consumable electrode welding process generally this is welding process generally this is used. Non-consumable electrode process used in non-consumable non consumable electrode non-consumable electrode welding process because what happens generally during a starting of the non-consumable electric arc if the tungsten touch the work piece if there tungsten touch the work piece then if there will be huge there will be generally voltage will be there; that means, during shorting of the electrode with work piece there is generally voltage reduce tremendously; that means, voltage reduction is very high.

So, if we use this types of this constant current power source then there will be current source will be a small a smaller size. So, what happens here there will generally chances of accident we will be less if we use constant current power source characteristics chances of accident interchange chances of un stability will be less a if we use constant current power source characteristics.

But, generally this constant voltage power source characteristics used in consumable types of a well type of electrode consumable type of electrode welding used in consumable types of electrode welding process welding process. Like is submerged arc welding process where generally electrode carrying current as well as its melt and consume inside consume in well zone then GMAW; that means, MIG welding process or GMAW process generally this types of welding is used.

So, this is generally a comparative or comparison between constant current power source characteristic and constant voltage character constant voltage power source characteristics character composition or we can see this is the difference between

constant current and constant voltage power source characteristics. So, we got very good idea about constant current characteristics power source and constant voltage characteristics power source.

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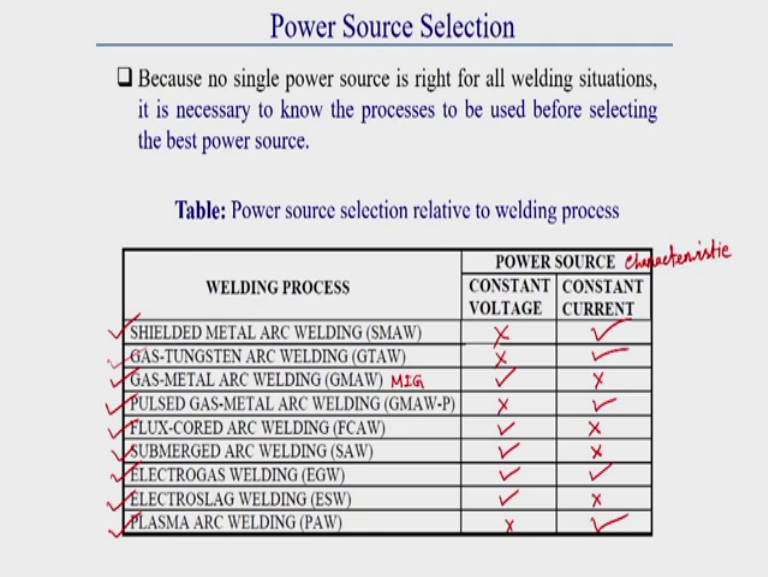

Now, we will go where we should use which welding techniques actually; that means, that means; that means, what types of power source we use for a particular types of welding process there that also we should know; that means, power source selection how it is done. We know that no single power source is right for all welding situations. It is necessary to know the process to be used before selecting the base power source.

So, first of all we should know what process is going to be used, then only we should we go for power source selection. Like here I am showing some welding process name left side and here what types of power source characteristic characteristics we should choose; what types of power source characteristic we should choose that also we should know.

Now, generally, Shielded Metal Arc Welding – SMAW, this shielded metal arc welding it generally a manual welding process. So, what we observe from the previous discussion of constant current and constant voltage characteristics generally shielded metal arc welding is a manual welding process. So, here generally we should we should prefer generally constant current power source characteristics. So, here generally constant voltage character characteristics is not preferable.

Similarly, Gas Tungsten Arc Welding process – gas tungsten arc welding generally is a non-consumable welding process non consumable electrode welding process. Here generally electrode carry only current and it is responsible for generating the arc, but it is not melted or consuming consume inside the weld zone. So, what happens this is a gas tungsten here generally electrode is null it electrode should non melting one.

That is why in case of gas tungsten arc welding process we should use constant current power source characteristics. Here also we should not use constant voltage power source characteristics because constant voltage power characteristics is not preferable for generally non-consumable electrode power source character what I have already discussed in previous slide.

Now, gas metal arc welding process or MIG or this is called MIG or GMAW process metal inert gas welding process or this is a general automatic welding, especially the its a automatic or semi automatic welding process. Here generally it is use a consumable electrode. This gas metal arc welding use the consumable electrode, that is why this gas metal arc welding techniques generally we should use constant voltage power source characteristics. Here generally constant current power source characteristics is not preferable.

Similarly, Pulsed Gas Metal Arc Welding process here generally constant voltage is not preferable because there is a pulse of current is there here generally constant current power source characteristic is preferable. Then, Flux Cored Arc Welding process, flux cored arc welding process is also a consumable arc welding process which were generally this as the flux is inside the electrode; that means, here the a metal core is available outside the metal core is available inside that metal that core generally flux is put it.

So, what happens here this flux cored arc welding is a consumable automatic welding process; here generally this electrode can be automatically feed also and it is a consumable welding process. So, this welding process as it is a automatic and consumable welding process here generally constant voltage constant voltage power source characteristics is preferable. Here generally constant current is not preferable then submerged arc welding process it is generally a consumable and automatic welding

process submerged arc welding. So, here also constant voltage power source characteristics is preferable.

So, similarly Electro Gas Welding process electro gas welding is a such process, here generally both the techniques both the characteristics we can apply; that means, both constant current power source characteristics we can apply here generally constant voltage power source characteristics is also applicable.

Now, Electro Slag Welding process; electro slag welding process here generally constant voltage it is also a automatic process and consumable electrode process here generally constant voltage is preferable, but here generally constant current is not preferable. Similarly, plasma arc welding process this plasma arc welding process is here generally this electrode is non-consumable. Here generally a tungsten electrode is used, so, that is why generally this plasma arc welding techniques constant voltage power source characteristics is not preferable here constant current power source characteristics is preferable.

So, we got the idea actually for which welding techniques what power source characteristics we should use. So, we can easily slip we can easily observe from this chart these are the generally widely applicable conventional welding techniques on (Refer Time: 17:25) industry, then you will you will see these are the conventional welding techniques which is which are generally widely used in industry industrial application especially manufacturing industry.

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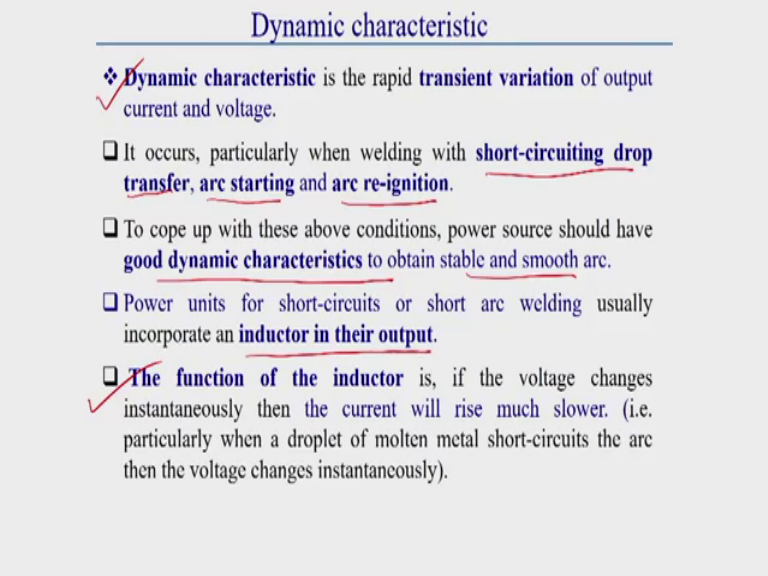

Now, we will go to dynamic characteristics of power source. So, we already discussed in details about the static characteristics of power sources now we will go what are the dynamic characteristics of power source. In case of a static characteristic power source the output is not tangent it generally there are tangent variation or generally there is not rapid change of current and voltage is not there or generally this output it is not depends on time.

That means, output is not is not generally this output variation in case of a static power source characteristics is not depends on almost time; that means, in a static characteristics this change of voltage and current is; that means, output voltage and current does not generally change with current rapidly. But, in case of dynamic characteristics power source generally this change of current and voltage change rapidly.

So, it is a generally it is the rapid tangent variation of here generally we observe the rapid tangent variation of output current and voltage. So, generally this types of rapid change of output current and voltage occurs in case of short circuiting drop transfer generally where the drop transfer is occur due to short circuiting of the arc, generally there we observe this types of dynamic characteristics of power source.

Generally then arc starting also there is a rapid change of output current and voltage is observed and arc re-ignition generally in this following situation we observe generally dynamic characteristics is very much important. Because, here generally rapid change of

output is there; that means, here output that is current and voltage which is depends on time which is highly depends on time. It is a tangent variation and it this tangent variation is rapid change actually.

Generally to cope up with the short circuiting arc starting and re-ignition generally re-ignition power source should have good dynamic characteristics good dynamic characteristics should be there to cope up with this above said condition for that because otherwise we will not get a stable or a smooth arc. So, if power source have good dynamic characteristics then we can get a stable and a smooth arc.

So, this that is why generally power unit for short circuiting or short arc welding usually in corporate and inductor in their output. That means, to stable the arc to for the stability and smoothening of these arc generally a inductor is used with output of inductor is used generally with output of the dynamic characteristics power sources.

The function of a inductor; that means, power unit with short circuit or short arc welding usually in corporate and inductor in their output. The function of a inductor is generally if the voltage changes or voltage reduce tremendously due to this short circuiting, then the current charge or current rise will be slower; that means, here the function of a inductor; that means, lower the current rise. Because if the voltage reduced due to short circuiting is rapid then the current charges will not be rapid, here the current charge will be slower the that is why generally the function of the inductor is used in case of dynamic characteristics power sources.

Now, if this current source will be more then what will be the problem? The if the current source of a arc if it will be more, then there is a chances of high electromagnetic forces. We know that if there is a flow of current then there will be generate some electromagnetic force around the arc. So, this if there will be high charge of current will be there then there is a chances of high electromagnetic forces. So, to generally if there will be a high electromagnetic forces, then there will there this arc will not be a stable.

So, there is a chances of spattering of the arc due to this spattering there will be the spattering of the molten pool also can be there so; that means, to avoid that spattering effect or to a stable the arc generally a inductor is incorporated. If we use an inductor in the output of this characteristics power source then what we can get here we can get a

smooth and stable arc because due to this inductor the rise of current will be much slower.

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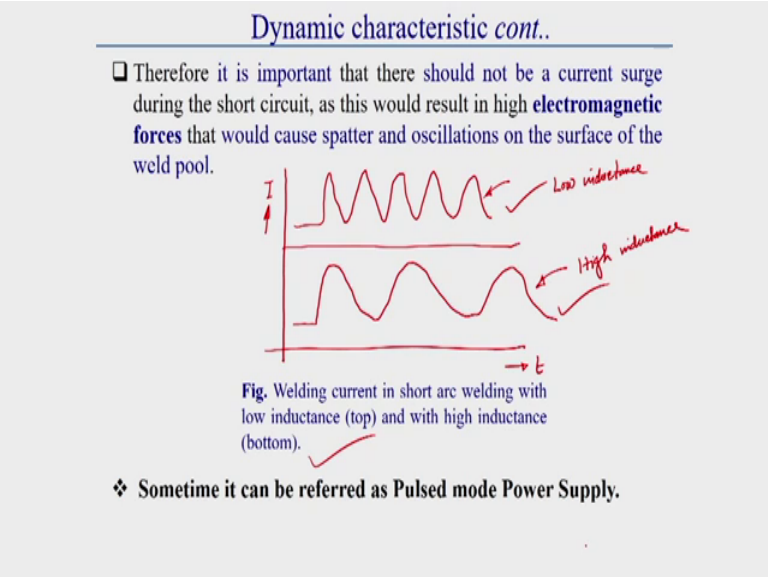

Now, here generally I am just showing then I will what is the function of inductor with output current or voltage output current. Here I am just showing a figure then you will get a very good idea from here. Let this is time t; this is time t here generally I am showing two figure here generally. Here this axis represent let us current I. So, how the current is varying?

These are the generally dynamic characteristics of a power source characteristics. This is one figure I am showing, another figure I am showing. Here you see in this figure generally the variation is very rapid means here this variation this; that means, number of pulse rate is very high here generally pulse means this each and every peak is call on pulse generally peep heap and peak is called on pulse.

So, this pulse general this rate of pulse is very high. So, and in this case the rate of pulse is comparatively low; that means, here the current change in this case the state of change of current or change of current is generally rapid comparatively rapid than in this case here generally change of current is slower. Why this is happen? This curve here this is happen due to the application of a inductor.

In this first figure generally here the inductance is low inductance due to the induct if the inductance; if the inductance is low then there is a high rate of generally there is a high number of pulse rate we observe. If the high inductance is there; if the high inductance is there then there is a solo variation of current is there. So, this is the means application of inductance or inductor of the output current with time. Now, this dynamic characteristics power source sometimes it can be referred as pulse mode power supply also.

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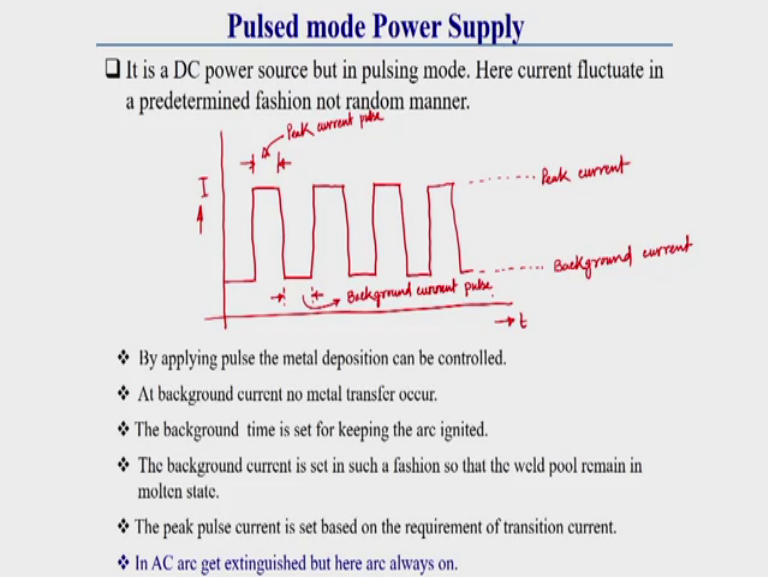

Now, what is pulse mode power supply? Pulse mode in pulse mode power supply also is a DC direct current power source, but here the output is pulsing mode. This is also direct current power source, but it is output is in pulse mode, this pulsing or; that means, this rate of change of current or voltage which is not arbitrary here generally this pulse mode is predetermined; that means, what should be the number of pulse that is predetermined here it this pulsing is not come arbitrary.

So, in pulse mode power supply here we can put the number of pulse what should be the number of pulse per minute or what should be the number of pulse per a second that we can a predetermine. So, accordingly this number of pulse we can control the deposition rate means per second how much metal deposition should be there or how much how many droplet transfer should be there in weld pool that we can control by this pulse mode power supply. How it is look like that I am the little bit explaining here then it will be very clear to you.

Generally, pulse mode power supply is a DC power supply here generally this tangent variation of current which is pulsing in nature how its look like just I am just showing its roughly. So, this is generally pulsing mode of power output; that means, this is a pulse mode now this has not a 0 current actually in this pulse there is no 0 current.

So, this lower current is called background current or minimum current of this pulse is called background current and hike highest current of this pulse is called peak current and the duration of peak current duration of a pulse peak current is called peak current pulse and duration of the and duration of the duration of one background current one background current pulse time is called background current pulse current pulse.

So, generally here one things you keep it in mind generally in this background current is set in such a way so that this arc will not extinguish. Generally what happens in case of alternating current there is a zero crossing for every cycle of the current there is a zero crossing. So, every time there is a extinguishing of arc is there, but in this case this background current is set such a way that this arc will not extinguish during this welding operation. And this peak current is set in such a way this is generally responsible for droplet transfer; that means, in peak current generally drop molten droplet will transfer.

So, here generally this number of pulse; that means, peak current and a background current generally this number of pulse we can predetermined. So, according to our requirement of weld deposition this number of pulse per second or per minute what it should be that we can predetermine. So, we can control the deposition rate in case of pulse mode power supply. So, this is also a generally what types of power source this is a also DC direct current power source because here there is no zero crossing of the current is the here, but this DC current, but this is a pulse mode.

Now, here so, we discussed about static characteristic power source and dynamic characteristics power source some others important note is also available for power source welding power source; about this important nodes I will discuss briefly is subsequent slides.

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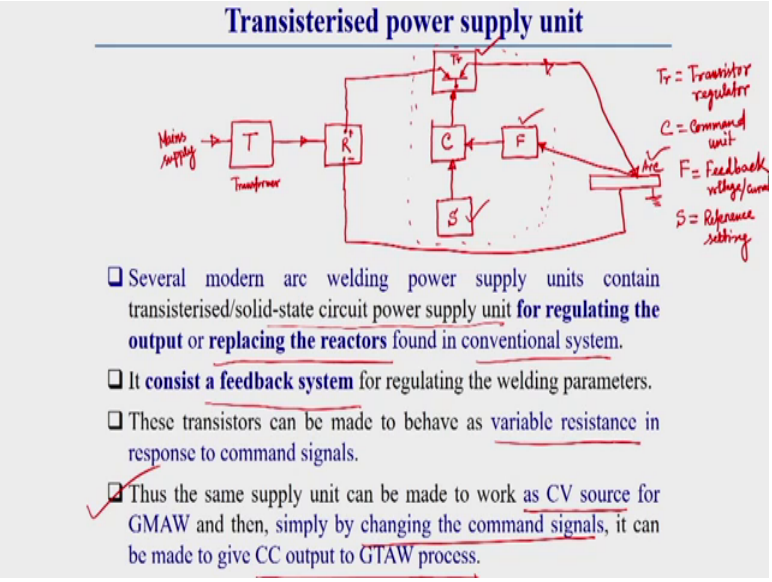

So, first of all generally apart from this above characteristic or above power source above characteristic power source or above discussed power source there is used generally in modern technology, there is use some other very important power source. That power source generally is a very latest development latest developed power source we can say this is a generally advanced development this is not a latest actually this is a advance development of welding power source of which is generally operated by transistor.

So, here generally we can control the output as per our requirement generally here this transistor power supply that is generally called transistor power supply unit. Here generally a transistor is used to control the welding output parameters; that means, as per our requirement this transistor generally change the signal and it can regulate the welding arc welding arc and here it can do the welding operation as per the requirement of as per the requirement.

Now, here this generally this power source how it is look like that we should know; what are the different component is available in this transistor power supply. This is a generally advanced types of welding power supply whatever the traditional welding power supply as I told already I discuss this is generally advanced types of welding power supply. Here general this power supply circuit diagram we can represent in this way like here generally this power supply circuit diagram I am just drawing ok. This I will explain in details then it will be clear to you.

This is also generally this is main supply or utility supply generally here generally DC current this is a transformer here generally this is a rectifier. So, from here generally this DC current. First of all I draw it then it will be very clear to you. It is look like that once you will get the idea then it will be very clear to you. So, this is generally that is. So, this is generally T r or you can say T r is transistor regulator actually transistor regulator this is generally transistor regulator.

Now, here generally there is a main supply from main supply which is goes to its generally convert this its goes to transformer, then it goes to rectifier which convert this AC current to DC current this is generally arc this is work piece actually. So, here this is called feed system this is generally called reference setting and there is a generally called command this is called command unit actually generally. So, how it is look like? So, once first I draw this circuit diagram then if I will explain then it will be very clear to you.

So, here a generally here this extra part is there; that means, transistor C is stands for command unit; command unit, then F is called feedback; F is called feedback voltage or current voltage or current. Generally it is general feedback the voltage or current is generally feedback the voltage or current generally S is called reference setting; reference setting. So, first of all I draw everything then T r is called transistor regulator.

Then what happens here? Here generally, first of all this DC current goes to transistor regulator then from transistor regulator generally it goes to arc. So, from this arc generally a feedback system is there. Then, from the arc if there will be any disturbance then this disturbance; that means, if there will be any change of arc current or voltage then this gives a feedback to this feedback system. So, it takes a feedback from feedback system and it takes it take from feedback system and it is goes to this command unit. So, in this command C command unit is go.

Similarly, some reference setting also you provide where generally reference setting also goes to command unit. Now, the input from reference setting input from this S and F it goes to command unit. In this command unit the function of command unit generally it generally find the error between this feedback and reference setting. This error generally its amplifies here and its gives a signal to this transistor regulator. This transistor

regulator, generally, then control the output according to the requirement of according to the requirement of welding process.

So, here generally this transistor take the signal from command unit. This as per the required as per the required signal of command unit, generally transistor regulator the transistor regulator the output signal of the arc. So, here generally output control is very carefully we can do by using this power supply unit. Generally, this is the complete circuit diagram; this is the generally complete circuit diagram of this is the complete circuit diagram of transistor power supply unit.

Generally, several model arc welding power supply unit contain this transistor or this is sometime called solid circuit power supply unit. This is used for regulating the output or generally refreshing this power source unit can replacing the reactors found in conventional system; that what I have already discussed; that means, three different types of reactor which generally used in case of AC current there what we discuss there generally use three different types of reactors. So, by using this types of transistor power supply unit we can eliminate that reactors set also.

Now, it consists a feedback system what I have already told you. It consists a feedback system which for regulating the welding parameter. So, according to this feedback system obtained from this arc, if there will be any distance generally this generally this feedback system give feedback to transistor regulator. So, transistor regulator automatically control the voltage and current in the arc region in this arc region. So, what happens here, generally due to this consistent of as it consists of feedback system, so, here generally regulating the welding parameter here generally we can control the welding parameter or we can regulate the welding parameter as per our requirement.

These transistor can be made to behave as variable resistance in response to command signal. So, these transistor we can be made to behave as a variable resistance in response to common signal. Due to this variable resistance this generally this power supply unit we can use as a constant voltage power source for GMAW process then I gas metal arc welding process as well as this power supply we can use in case of constant current output for GTAW process also because this thus the same power unit can be made to work as constant voltage source for GMAW and simply by changing the common signal it can be made to give CC output to GTAW process.

So, it can be made to give CC output or the constant current characteristic output to GTAW process means gas tungsten arc welding process.

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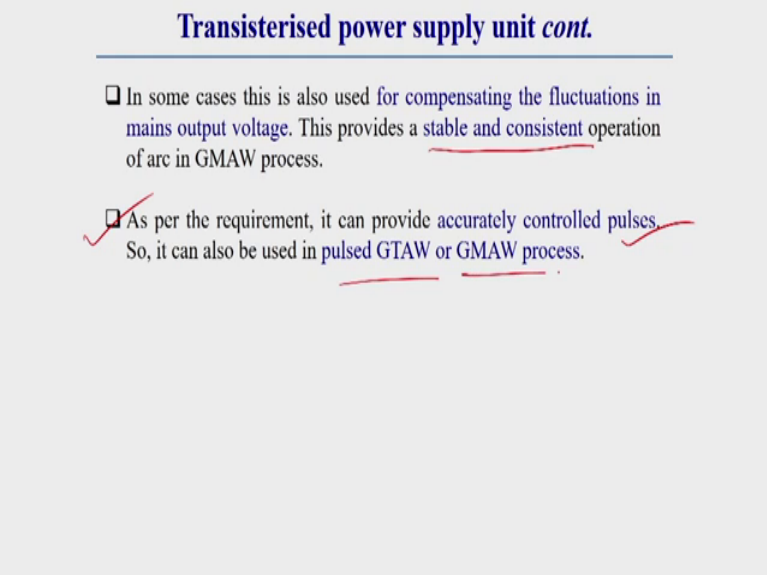

Apart from this thing in some cases this transistor power supply unit also can reduce the fluctuation in main output voltage; that means, it can compensate the fluctuation in main output voltage also. That is why, by this power supply generally we can get a stable and consistent operation of arc. So, by this we can get a stable and consistent operation of arc or this provide a stable and consistent operation of arc especially in GMAW process.

Now, as per the requirement generally this power supply can provide accurately control pulse. These as per our requirement this power supply can provide accurately controlled pulse also. So, it can also be used in pulse GTAW or GMAW process also; that means, pulse mode power supply. So, this by using this power supply we can get constant current power constant current power source characteristics by this single unit we can get constant voltage power source unit or by this power supply we can get pulse mode power supply output also. So, this is a very advanced level power source unit, so, this all about different power source we generally used in conventional welding processes.

Now, we will go some other important note which we should know in details. Like here generally in case of power source what we can observe in case of power source generally we can observe there is use to feed the electrode.

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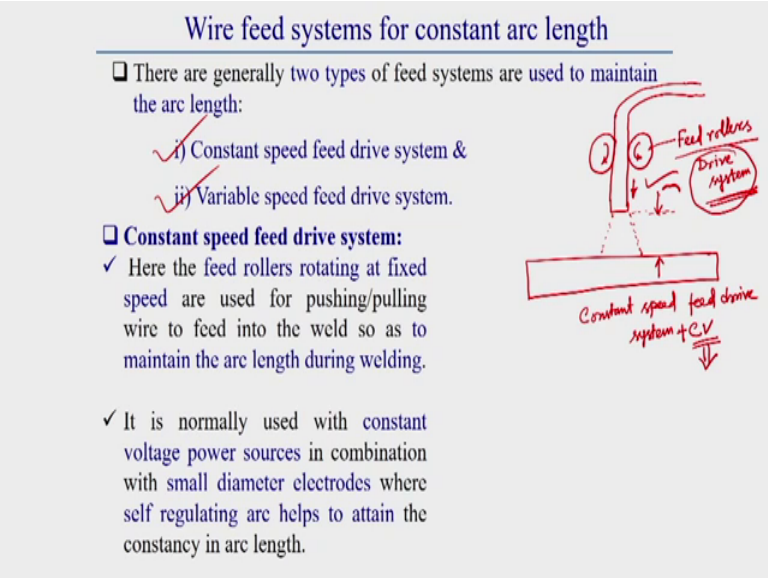

Generally you we see in case of continuous in case of to feed the electrode; to feed the electrode to the feed that this is called generally this generally electrode which is generally wounded is a roller, this wounded is a generally wheel, this electrode generally wound with a with a wheel. Generally, this electrode generally have a speed which is controlled by some feed roller this is called feed rollers. So, by rotation of this roller generally what happens a speed of this the speed of this consumable electrode a speed of the consumable electrode is maintained.

Now, this feed roller drive system this feed roller have some drive system; this speed roller have some drive system. So, by this drive system we can control the speed of the feed roller; that means, by this drive system we can control the speed of the feed roller. Sometime this drive system is generally give constant speed sometime this drive system; this drive system can give very speed. So, depending upon this output of this drive system generally there is two different types of; two different types of wire feed system are available.

But, this two different types of wire feed system is one is called; so one is called constant speed feed roller system; another one is called variable speed feed roller system. Generally, in case of constant speed feed roller system have the feed roller rotating at a fixed speed generally which is used for pushing or pulling wire to feed into the weld so as to maintain the arc length during welding.

So, generally this feed roller is used to movement of this consumable electrode. So, here generally what happens due to this pushing or pulling due to this constant is feed roller system due to this pushing or pulling this roller can move down or direct rotate down or clockwise direction as well as anticlockwise direction. So, generally by pushing and pulling we can control here the arc length, but this roller have a constant speed this roller generally provide a constant speed of filler wire.

So, these types of constant speed feed roller system generally used with constant voltage power sources in combination with a small diameter electrode. Generally, it is used for this types of constant voltage power source this is let us constant speed constant this is generally constant a speed feed drive system. Feed drive system is constant a speed feed drive system generally used with constant voltage it is generally used with constant voltage power source, in combination with a small diameter here generally some a small diameter electrode is used.

So, if we use this feed drive for constant voltage and with a small diameter electrode then what happens, here we can get a generally self regulating here and due to this constant voltage power source characteristics. Here due to this self regulation regulating characteristics of self regulating characteristics of constant voltage power sources here generally we can maintain the arc gap. So, here how the arc gap or arc length remain constant here the arc length remain constant by self regulation characteristic of the; self regulating characteristics of the constant voltage power source.

So, here generally either here the speed of the roller is constant, but sometime due to some disturbance if there is a change of voltage or change of arc length is there that generally compensating by self regulating characteristics of constant voltage power source. So, these constant voltage so this constant is feed drive system generally used with constant voltage with self regulating characteristics power sources. Then, if the speed of the roller is constant then where due to some changes if there is any change of arc length or other thing is there then due to this self regulating characteristics it can maintain its required gap or it can maintain the arc length fairly constant.

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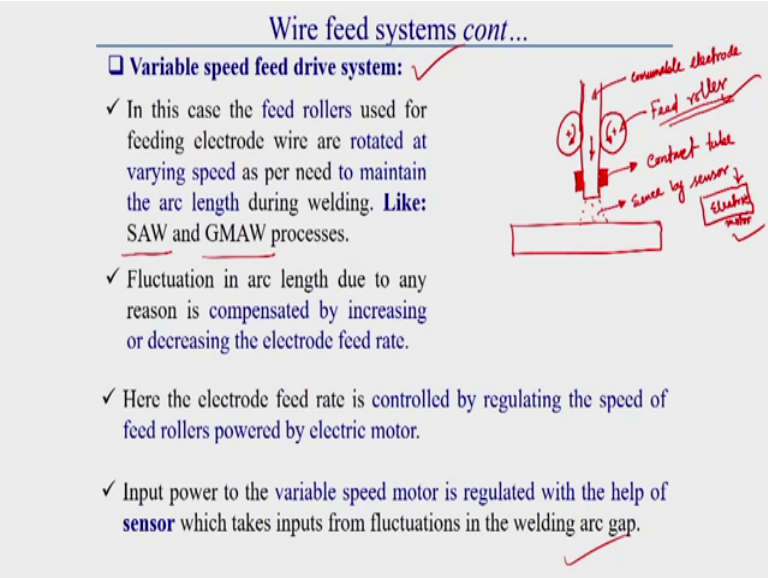

But, in case of variable speed power source unit in this case generally feed rollers used for feeding the electrode wire are rotated at varying speed as per need to maintain the arc length during welding. This types of power source unit generally used for automatic welding process especially in submerged arc welding like GMAW welding process, consumable types of welding generally submerged arc welding that in consumable electrode welding process generally this types of variable speed drive system and little bit as advanced welding process.

Generally submerged as GMAW welding process generally this types of variable speed feed drive system we can see. Here generally fluctuation in arc length due to any region is compensated by increasing or decreasing the electrode feed rate. Here the generally here fluctuation in arc length due to any region is compensated by increasing or decreasing the electrode feed rate here the electrode feed rate is controlled by regulating the speed of the feed roller which is powered by electric motor. Here generally input power to the variable speed motor is regulated with the help of a sensor which takes input from fluctuation in the welding arc curve.

So, once generally, this how this variable speed power drive is look like? The variable speed power drive is look like this is generally feed roller. This generally feed that electrode; this is generally consumable electrode. Generally in this power unit in this

drive system in this drive system generally there is a contact tube there is a contact tube here generally contact tube is there.

So, this is generally feed roller. This is generally feed roller. This feed roller generally derive by a system this feed roller generally operated by a motor. Generally this motor is variable speed motor. So, here generally like in previous case constant in feed to constant in feed drive system they are the speed of the feed roller is constant, but here the speed of the speed roller can be variable in nature. So, here if there is any change of these arc voltage or arc current generally it gives a sense, it gives the sense by a sensor to the electric motor to the generally these gives a sense by sensor to electric motor electric motor.

So, by these generally motor get the power and according to this sensor sense this motor control the speed of the; speed of the feed roller. So, these generally feed roller is controlled by this by the sense which is collected by a sensor this sensor generally sense the input to motor then according to these sense this motor control the speed of this; speed of this feed roller. So, then generally if there is any fluctuation then generally according to this; according to this sense or input from the sensor this feed roller control its speed and here then arc length maintain it is constant length.

So, here generally self regulating types of characteristics is not available or self regulated characteristics is not require here generally by controlling the speed of feed roller itself here generally we are controlling the required arc length. So, this is generally wire feed system.

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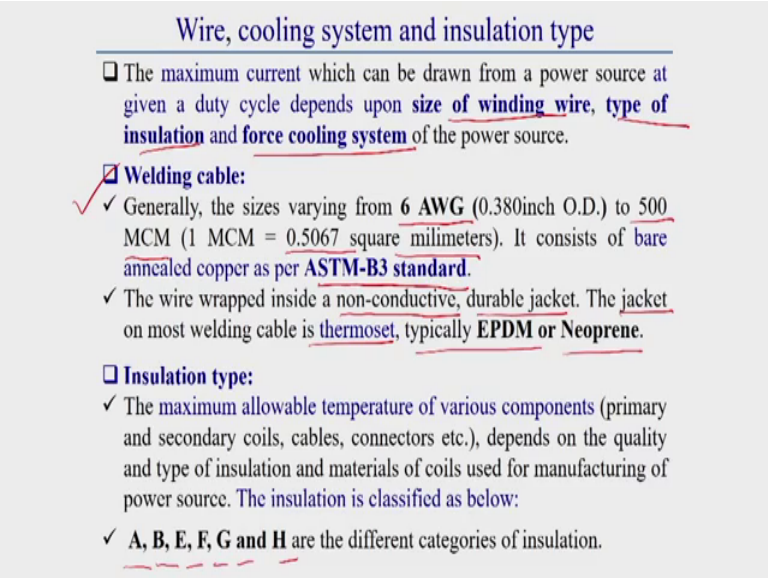

Now, at the last actually we should know little bit what are the wire generally cooling system and is insulation unit used in case of power source unit that also we should know. Here actually once you will be in industry this types of information also we should require because let us we are going to purchase some electric power source electric power source.

Generally they are these types of wire cooling system what should be the wire use of wire cable what should be the cooling system, what should be the insulation type of briefly we should know about this thing. If we know this thing we can get as per our required power source; that means, we can get we can we will not actually so, if we know this thing then we can apply this knowledge in industry also.

Here generally the maximum current which can be drawn from a power source at a given duty cycle depends on what? Depends on size of wire type of insulation and generally a air cooling system. Generally always we should remember here generally in case of welding power supply force cooling system is used. Then, what are the welding cable we use? Generally, in welding system in case of welding this power cable generally made from annealed copper bar which is always standard that is called ASTM-B3 standard. This wire cable generally this welding cable have a size which is varying from 6 AWG to 5 MCM.

Now, here we should know what is AWG? AWG means American Wire Gauge – A for American, W for wire and G for gauge. Generally one this 6 AWG equivalent to around 0.380 means outer diameter of copper cable and it can be maximum it can have a maximum size, so, this is generally within a range of 500 MCM. Generally 1 MCM is equal to your is equal to generally 0.5063 square millimeter. So, 500 MCM is equal to almost a cable bar which diameter is around 8 millimeter.

The these wires generally wrapped inside a non-conductive durable jacket. This durable jacket generally made by thermoset material this thermoset material especially used for welding purpose is EPDM or this is called generally neoprene.

Now, generally insulation what types of insulation generally used in case of welding power source? Generally, insulation is from overheating of the power source actually this insulation also have different categories. Generally in case of welding power source these are the following types of insulation generally use like this installation can be categorized as A, B, E, F, G, H. So, each and every insulation have some different composition as well as we say it has some different temperature tolerance limit.

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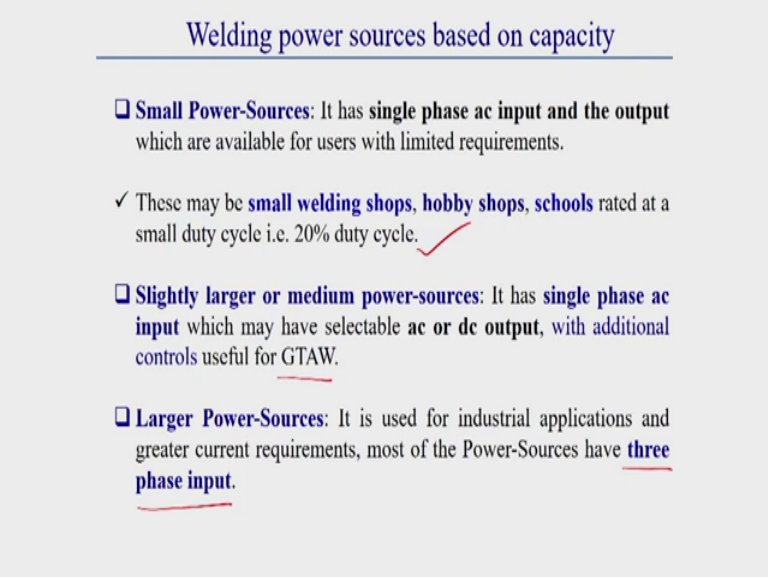

So, so this all generally some other a small things we should know actually generally. So, here generally so, at last actually little bit I am I want to tell because once what are the different types of power source generally used in toy industry, school industry and in actual heavy industry that also we should know.

Generally in case of hobby shop, a small welding shop or schools generally the power source which is used that power source is called a small process. This power source generally have a current range varying from 82 to 250 ampere. These a small power source this generally operated by a single phase main supply and gives a it gives a output which is also a AC in nature. So, here input and output in case of a small power source input and output both are alternating current in nature.

Generally this a small size power source which current range is generally within a range of 80 to 250 ampere so, this is generally used in a small welding shop, hobby shop or school and it has rated at a small duty cycle that is 20 percent duty cycle only. Then slightly larger medium power source also is there it generally how its generally categories? Slightly large means here the current range is little bit in higher size compared to this is small size. Here the current range like varying from 175 within a range just I am giving a rough range actually within a range of 175 to 350 ampere.

So, this generally power source generally have is called slightly larger medium power source. It is it generally operated by single phase power supply, but it generally its input it AC, but it output can be AC or DC with additional control is also there. This additional control generally required for GTAW process. So, this is generally slightly larger medium power sources.

The large categories generally which is used in actual manufacturing industry generally where this current range is also from higher side current range should be higher side which generally operated by a three-phase utility power supply or three-phase main power supply. Generally this power supply have a current range more than generally 350 ampere which have a maximum current more than 350 or more current range. So, generally this large power supply will always operated by a three-phase input.

So, these all about the power sources, this all about the power source of welding processes especially traditional welding processes power sources, its characteristics this is all about traditional welding power supplies or power source. Next class I will discuss about physics and principle involved in different types of traditional welding processes.