Fundamental of Welding Science and Technology

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Module - 1
Lecture - 2
Classification of Welding and Joints

Today, I am going to deliver a lecture on Classification of Welding and Joint. In previous class I have already discussed about introduction of welding. At, the end of that lecture so, I have already started about classification of welding. There we have seen there are generally 2 different types of joining process are there; one is mechanical bonding and other one is atomic bonding. In atomic bonding categories, then early welding comes. Based on different types of aspects, we have also seen that welding can be categorize depending on source of heat, depending on it is mechanism, they can depending on it is phases of base and filler material, depending on it is mechanism.

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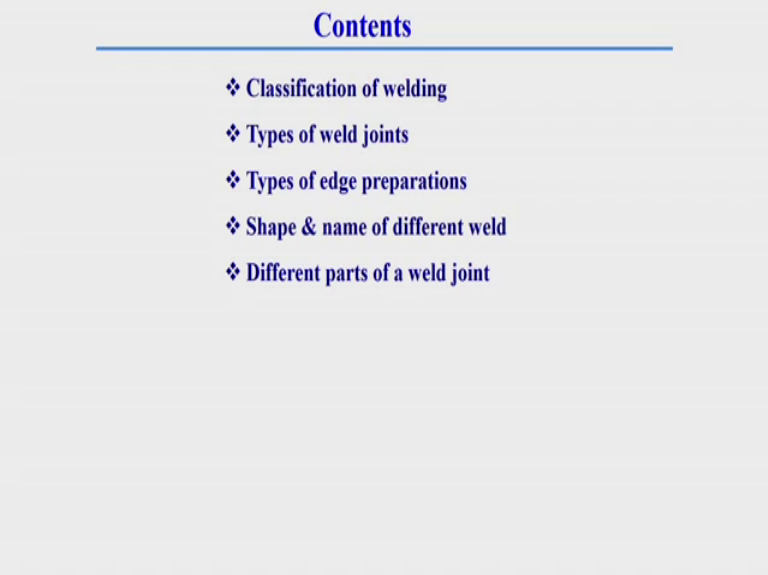

Now, today I am going to deliver a lecture on classification of welding and joint. This is the content of today's lecture, that is classification of welding, types of welding weld joints, type of edge preparation, shape and name of different weld, and different parts of a weld joints.

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Classification of welding actually I have already started in yesterday's class, where we have seen there is different aspects based on different aspect, we can categorize the welding process in 6 different categories. That can be depending upon the source of heat, depending upon the application of pressure, depending upon the different phases of base and filler material, depending upon the composition of the joint, depending upon the position of electrode and depending upon the mechanism.

So, in fast lecture or in previous lecture, I have already discussed about depending upon the source of heat. And, it is categories I have already explained in details.

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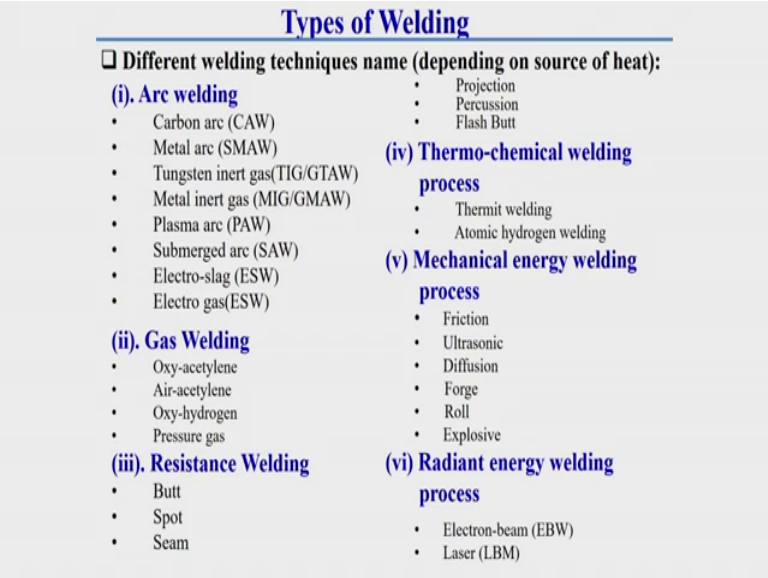

This is the different welding techniques; we generally categorize depending upon the source of heat I have already explained in detail. Now, we will discuss the rest of the welding categories.

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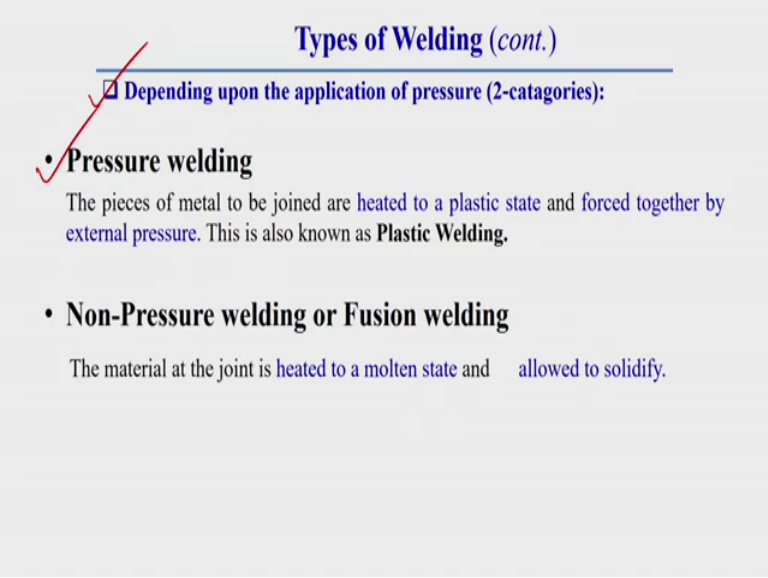

Like depending upon the application of pressure, this welding can be further categorized into 2 different categories. This can be on a pressure welding, another categories can be non-pressure welding or this is sometimes called fusion welding, this is popularly known as fusion welding.

General, generally in pressure welding the pieces of metal to be joined are heated to a plastic state and forced together by external pressure. As here external pressure is applied for joining purpose that is why this is called pressure welding. This is also known as a plastic welding, because here the temperature does not goes beyond it is melting point. Here, the material is plasticize that is why and it is joined together, that is why what happens this is called plastic welding.

Now, in non-pressure welding or fusion welding in this welding process the material at the joint is heated to a molten state and allowed to solidify. So, here the temperature goes beyond it is melting point. So, here metal become liquefied. So, here no external pressure is required to put to join the metal. Here, generally due to this inter materialic fusion; that means, they are generally due to fusion of molten metal here joining is taken place.

Now, pressure and non-pressure welding is we can we can group whatever the welding techniques, I have already told in classification of source of heat the similar welding categories can be here also we can put together.

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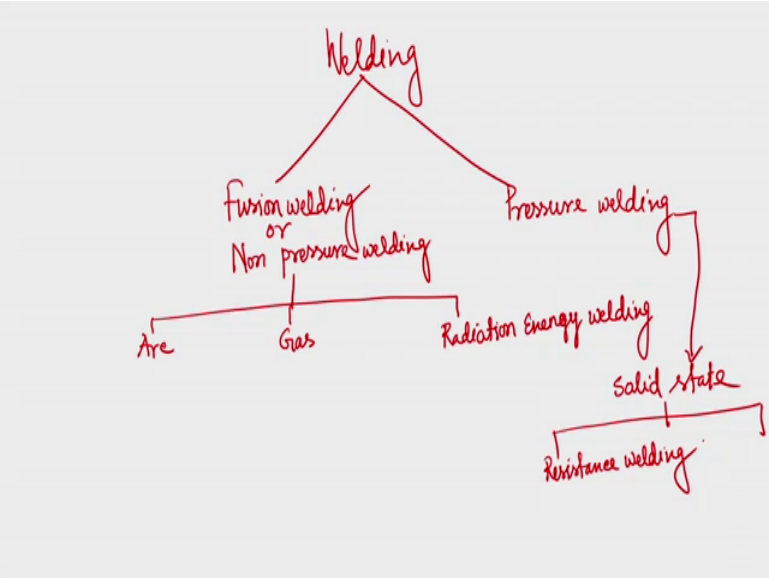

Depending upon this application of pressure welding can be categorize into 2 different categories; one is fusion welding, one is fusion welding, another one is pressure welding. This fusion welding is also is, this is also called fusion welding or non-pressure welding.

So, in fusion welding categories there is all the welding process, which is in the categories of arc welding, this is gas welding, then electron; that means, radiation energy welding, radiation energy welding. This in fusion welding the temperature goes beyond it is melting point this categories in these categories all arc welding process, gas welding process and radiation energy processes come into this category.

In case of pressure welding in these categories solid state welding process generally come in these categories. Like the solid state welding can be group into 2 different categories; one is resistance welding and another one is can be friction welding.

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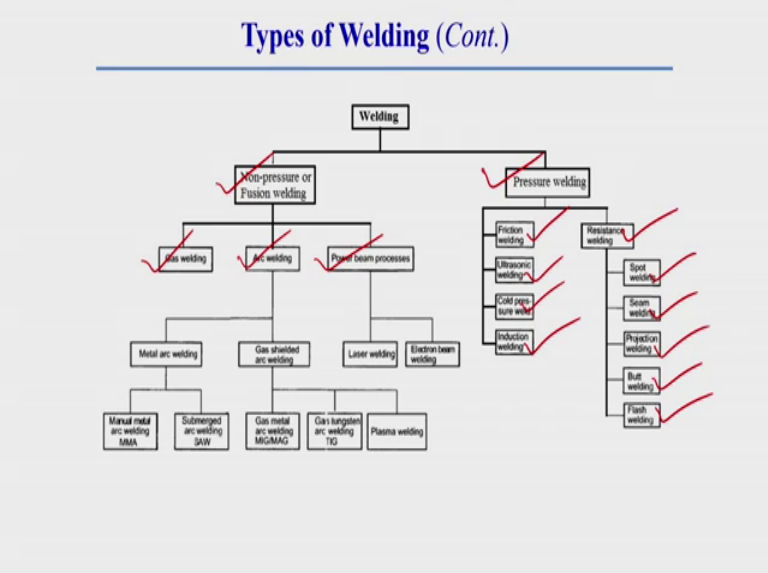

So, depending upon the pressure application of pressure the welding can be categorized into non pressure welding, or fusion welding or it can be pressure welding.

Generally non pressure welding the it consist all gas welding technique arc welding technique and power beam welding techniques, where an in where as in pressure welding techniques generally there is different types of plastic or solid state welding process are there, where generally the material become plasticize. And, due to application of pressure it joined together. In this category there can be friction welding, there can be ultrasonic welding, there can be cold pressure welding, there can be induction welding, and in resistance welding also there can be different types of resistance welding. Like a spot, seam, projection, butt and flash welding.

And, generally in non-pressure welding I have already told you whatever the all welding techniques, I have explained in gas arc and power beam welding. In this categories generally all the welding techniques lie in non-pressure welding techniques.

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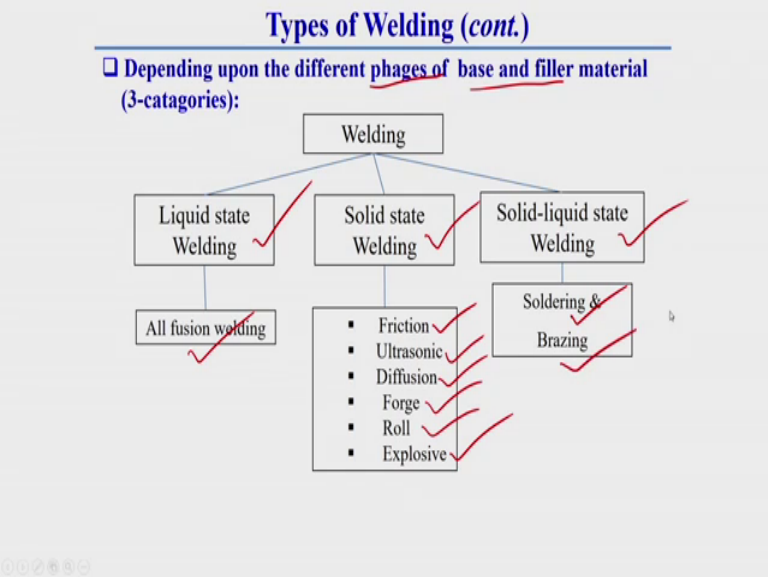

Now, depending upon the different phases of base and filler material phases of base and filler material, this welding can be further categorized into 3 different categories; that means, phases especially here whether here it is liquid phase or solid phase. Generally during welding the material, which we are using that can goes to liquid state, solid state, or there can be both liquid and solid state. So, what happens if the material goes beyond it is melting state that is called liquid state. welding That means, here the phase is liquid, then in solid state welding generally here the temperature does not goes beyond it is melting points. Here generally material is in solid state that is why this is called solid state welding process.

And, solid liquid state means here generally one part of the material is in solid state and other part of the material is in liquid state. So, that is why it is called solid liquid state welding. Especially here filler material in case of solid liquid state welding here the filler material which we are using for joining, that filler material goes beyond it is melting points and the material in the material which is used to join that material; that means, parent material here generally does not goes beyond it is melting points.

Generally in liquid state welding process all fusion welding process or non-press non pressure welding process are in this group, then in solid state welding can be friction welding, it can be ultrasonic welding, diffusion, forge, roll or explosive welding. And, in solid liquid state welding process, this can be soldering and another one is brazing process.

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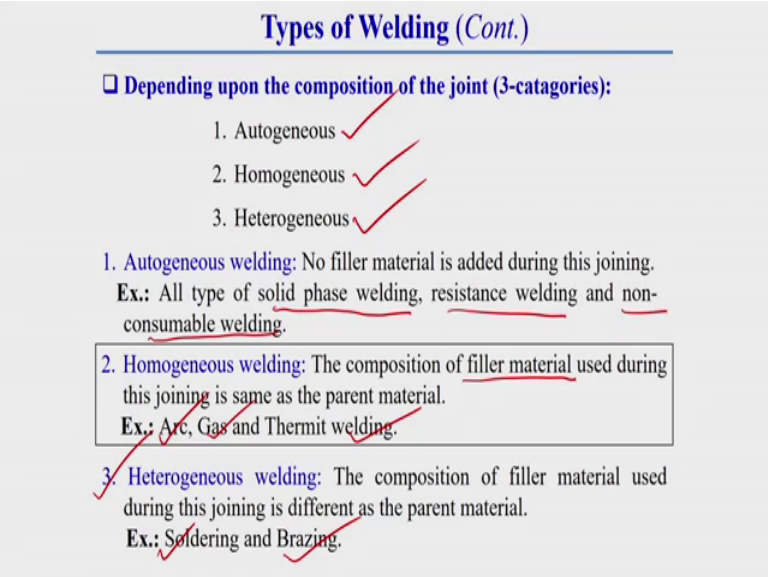

Now, depending upon the composition of joint this welding can be further categorized into 3 different categories; it can be autogeneous, it can be homogeneous, or it can be heterogeneous.

In autogeneous welding generally here no filler material is used during joining, that is why it is called autogeneous welding process. In these categories of welding process generally all solid state welding or solid phase welding is come. Generally, then here there will be resistance welding and non-consumable welding process. Non-consumable welding process means where there is not use any filler material, to fill the gap between 2 piece of metal or material.

In homogeneous welding generally the composition of filler material, and the base material, or the parent material is same. So, that is why here this welding process is called homogeneous welding process. In homogenous welding process all arc welding process, gas welding process, and thermit welding process is come. Then in heterogeneous welding; in heterogeneous welding the filler material and the base

material, which we are going to join have different composition. Generally in these categories soldering and brazing is come soldering and brazing are come.

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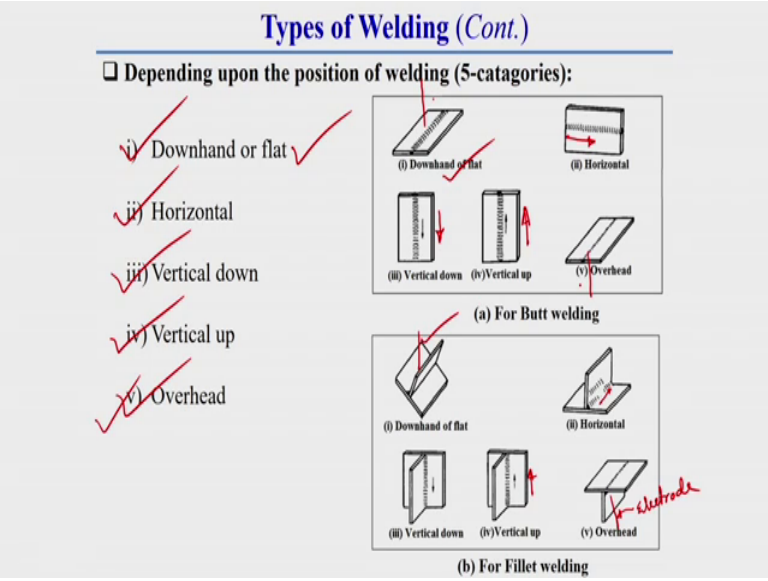

Now, depending on the position of welding this welding can be further categorized into 5 different categories. This can be down hand or flat welding process, this can be horizontal process, this can be vertical down welding process, this can be vertical up welding process, and this can be overhead welding process. These welding process are arranged according to the complexity of the process. Like here these Downhand welding process is easiest process and here because here the filler material is deposited towards the direction of gravity, that is why it is the easiest welding process, downhand welding process.

And, this overhead welding process is the most complex welding process, because in this welding process generally the electrode or filler material we have to deposited against the gravity. So, what happens this is top welding process. This is the most complex welding process according to the position of welding. In this figure this is called downhand welding process, where the electrode we say we are applying this electrode in down hand direction. In the direction of gravity, that site is called down hand welding process this is the figure for bar for butt welding process.

Now this is called horizontal welding process. Horizontal welding process means, where the movement of electrode is horizontal direction that is why what happens here

generally electrode position is horizontal to the surface of the plate, that is why it is called horizontal welding process.

In case of vertical down hand welding process, here generally the movement of the electrode toward the downward direction vertically and here this in case of vertical upward direction; that means, vertical up welding process here the movement of electrode towards the upward direction in vertically. And, in overhead welding here the electrode is put against the gravity that means, this is the electrode which is put against the gravitational direction.

Similarly, these are the different types of the positional welding for flat welded joint, like down this is down hand here generally electrode is put downward direction, it is horizontal welding process, where the electrode is position horizontal direction. And, this is vertical down hand welding process here electrode moves towards down hand direction or downward direction. And, this is the vertical up here generally electrode movement and position toward vertically upward direction. And, this is the overhead welding process, where the electrode let this is the electrode this electrode is put against the gravity that why this is called overhead welding process.

So, from this figure also one can easily be able to observe that ok, this word welding techniques is more tough and it here the easiest welding process is down hand welding process that is; that means, this welding process or this welding process.

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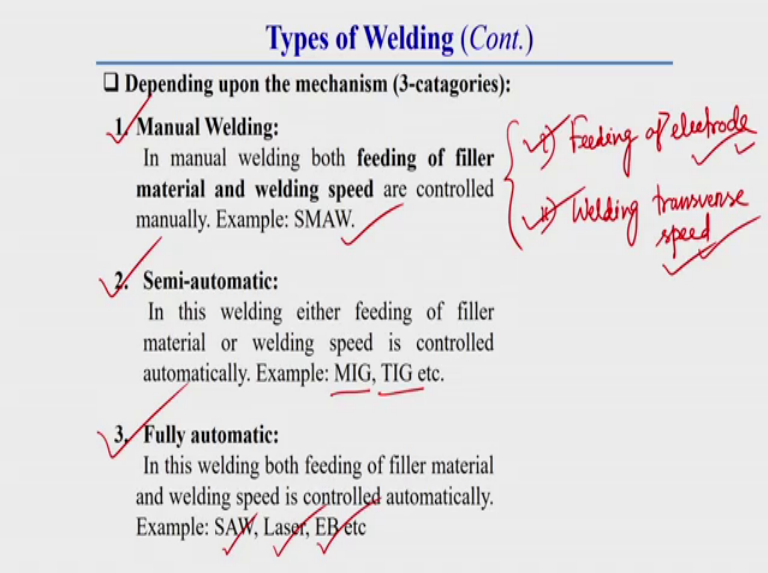

Now, depending upon the mechanism this welding can be categorized into another 3 different categories or 3 different categories, this can be manual welding, this can be semi-automatic welding, or this can be fully automatic welding.

Now, before going to in details about manual welding and semi-automatic welding, here we should know 2 very important parameter of welding; one is called feeding of electrode feeding of electrode, and another one is called welding speed welding transverse speed or this is sometimes called traverse speed. Now, generally feeding of electrode generally in case of welding to deposit the filler material there is a continuous movement of feed of electrode is there. So, that has also a speed. So, that is why what happen this is this is a very important parameter. Generally, this feeding of electrode decide how much molten material should deposit along the welding region.

So, this is a very important parameters. And, welding traverse speed means what should be the speed of welding per second or per hour; that means, how much length of welding should be done per minute or per second or per hour. So, these 2 parameters is very important parameter. Based on these 2 parameters generally this welding can be categorized in 3 different categories; one is manual welding, one is semi automatic welding, another one is fully automatic welding

Like in case of manual welding if this feeding of electrode and welding traverses speed control manually, that is why this is called manual welding process. Like SMAW; that means, shielded manual metal arc welding is generally in this group. In case of semi-automatic welding process, in this welding process generally feeding of electrode or welding traverse speed, either one of these is controlled manually and another one is controlled automatically. So, here one part of this welding parameter is controlled automatically, that is why this is called semi-automatic welding process.

In this category generally MIG, welding TIG welding is come like in MIG welding means metal inert gas or GMAW welding this is also called GMAW welding. Now, fully automatic means was both of these parameters; that means, feeding of electrode and welding traverse speed both is controlled automatically, then that is called fully automatic process. In these categories there is a lot of latest welding technologies are there like submerge arc welding, laser welding, electron beam welding, also in these categories.

Now, we will we have already discussed about different welding process. Now, we will see what are the different types of weld joint?

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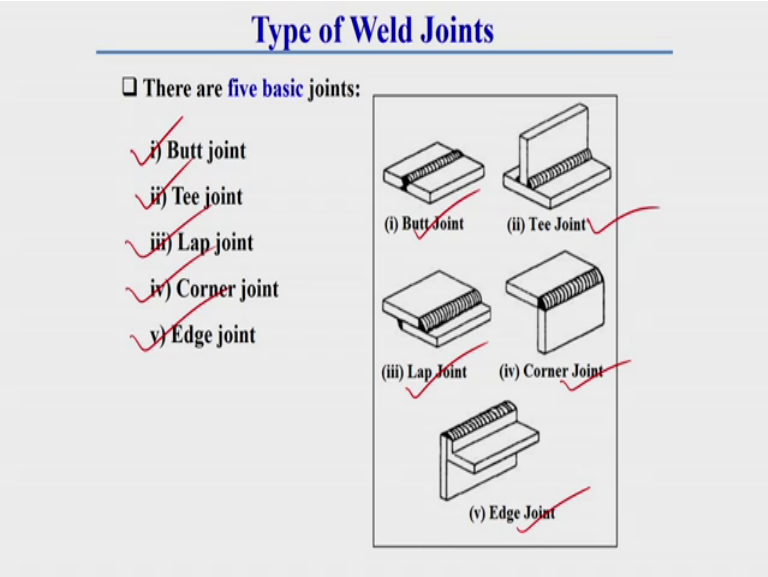

Generally, there are 5 different types of welding joints are there, where these 5 different welding joints are one is called butt joint, another one is called tee joint, another one is called lap joint, another one is called corner joint, and another one is called edge joint. This symmetric diagram shows this is first one is butt joint, this second one is tee joint, third one is lap joint, corner joint and edge joint.

The detail about this weld joint I will discuss in subsequent slides.

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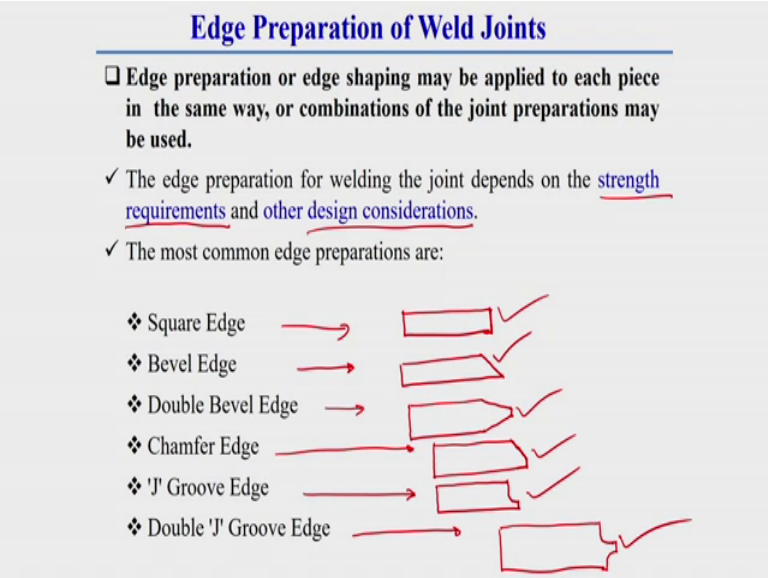

Now, before going to in details about butt welding and different types of welding joint here, first of all I will discuss about edge preparation of weld joint. Edge preparation or edge shaping may be applied to each piece in a same way or combination of the joint preparation maybe used. The edge preparation for welding joint depends on strength requirement and other design consideration; that means, here generally edge preparation is done in a welding joint depending upon the strength requirement, and some design considerations. There are generally 6 different edge preparations commonly used for welding joints.

These are a square edge a square edge a square edge generally in this edge preparation edge of the work piece as a shape which is square in nature; that means, there is no edge preparation is there. So, that is why this is called a square edge preparation, then second edge preparation is bevel edge preparation. In these categories here a bevel types of shape is provided this is bevel edge preparation, where a shape of angle put in the work piece.

In case of double bevel double bevel edge preparation generally put for thicker section especially for thicker section, where generally bevel angle is made from both the side of the from top side as well as bottom side of the plate.

Then in chamfer welding in this category generally it is this chamfer edge preparation is look like a bevel with a route face. These categories this is generally chamfer type of

edge preparation, there can be 'J' Grove Edge preparation in J groove edge preparation generally the edge of the plate is look like this; that means, J shape. And, this can be double J groove also, double J groove generally used for thicker types of weld plate, from this side as well from this side. So, this is generally double JS from top side of the plate as well as from bottom side of the plate generally edge preparation is done.

So, these are the edge all edges, which generally prepared for a strength requirement or some design consideration of the welded joint. So, these generally 6 different types of edge preparation is there. Now, depending upon this weld joint and edge preparation all welding has been categorized into the many different categories.

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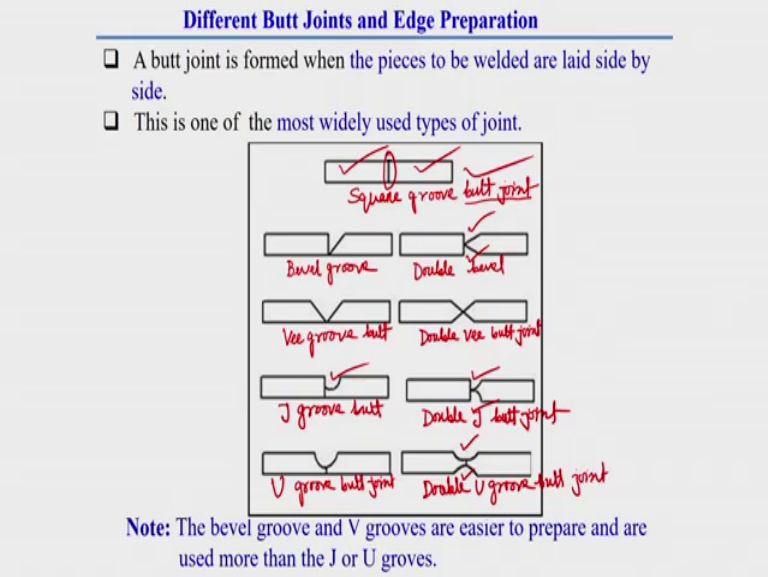

Like different butt joint with their edge preparation, you see by applying generally different edge preparation in butt joint, there can be different types of Bart butt welding joint. Like, you see here generally the edge preparation is done, here generally the edge preparation is done, in first categories a square type edge preparation is done. That is why in this welding process known as a square groove butt joint.

Because, here generally a square edge preparation is used for which type of joint butt joint. Now, before going to details about all these categories here we should know what is butt joint? A butt joint is formed generally when the pieces to be welded are laid side by side. Generally here this piece and this piece is laid side by side. So, here all the joining categories all the weld joint here whatever the welded joint here we are showing,

all the joint categories is a square all the joint categories are butt joint different types of butt joint.

Here the name of this here generally bevel types of edge preparation is made, that is why these welding techniques name is bevel groove butt joint. Here as this bevel is made both top and bottom side of the plate, that is why it is called double bevel; double bevel butt joint. This is generally here this shape is made which is look like V, that is why this is called Vee groove butt joint.

Here as this Vee is put both top and bottom side, that why this is called double Vee butt joint butt joint. Similarly, as this J shape is made out J edge preparation is made here, that is why it is called J groove butt joint. As these J is put both top and bottom side that side it is called double J butt joint. So, in this way generally depending upon the edge preparation and type of joint there can be different types of welding joint. For butt, butt welding categories itself. So, this is generally call U groove bed butt joint, because here the shape of the edge preparation is looking U type. And, this is called double U group butt joint, because here both top and bottom side U groove is made.

Now, here we should know little bit why this top side, bottom side, why double side, single side, edge preparation is required. This edge preparation and edge preparation in the welding joint is required, because of different reason. The main reason of this edge preparation is proper accessibility of filler material in the welding or on joint region is very much essential.

So, if we make edge preparation properly for a particular joining process, then what happens we can get better quality of welding both a strength, as well as life of the structure point of view?

Now, what happens generally this edge preparation is done for better accessibility of filler material and electrode. Now, here one things we can see this single types of edge preparations; that means, single or; that means, single types of edge preparation means bevel groove, single bevel groove, single Vee groove, single J groove, single U groove. These are the single groove edge preparation generally done for thin section, but these double types of thing double bevel, double Vee, double J, double U groove butt joint generally applied for then only the thickness of the plate is more than double types of or both sides edge preparation is required.

Here, one very important things we should know this butt welding joint is the most widely used welding joint.

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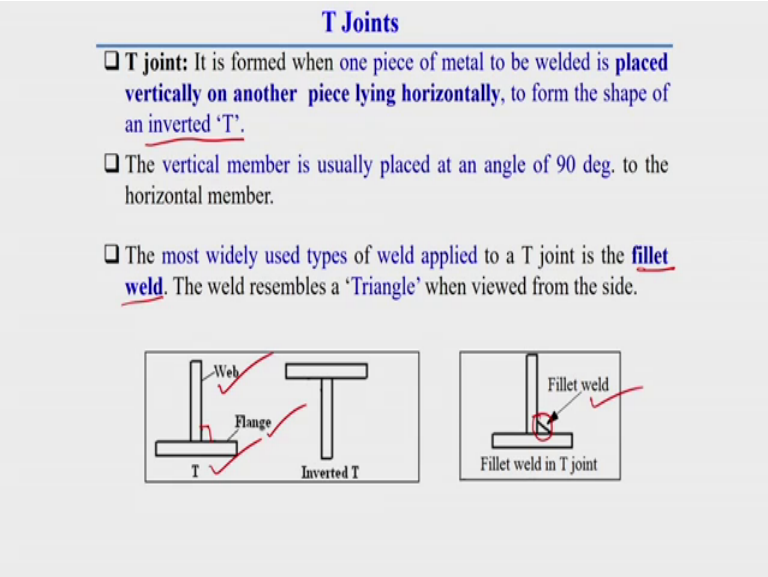

Now, 'T' Joint; T joint generally it is formed when one piece of metal to be welded is placed vertically on another piece by lying horizontally to form the shape of an inverted. T joint a T joint is formed when one piece of metal to be welded is placed vertically on another piece lying horizontally, to form the shape of a inverted T. Inverted T means the T this is the inverted T shape. Generally, in this fillet joint this bottom one is called flange and this top one is called this vertical one is called web of the structure.

Now, here the vertical member which is put here the angle of this vertical angle vertical member is at a angle of 90 degree to the horizontal member. Now, here the type of weld joint or type of weld here is used that is called generally fillet weld. The joining, which is done in case of fillet welding process that is generally called fillet weld. Generally, here the fillet weld re resemble triangle when viewed from the side, if we see the fillet weld then it is resemble a triangular shape from the side of the structure side of the welded joint. So, what happens here the weld resemble the triangle when viewed from the side.

The most widely used type of weld apply to a T joint is the fillet weld. This weld resembles triangle when viewed from the side.

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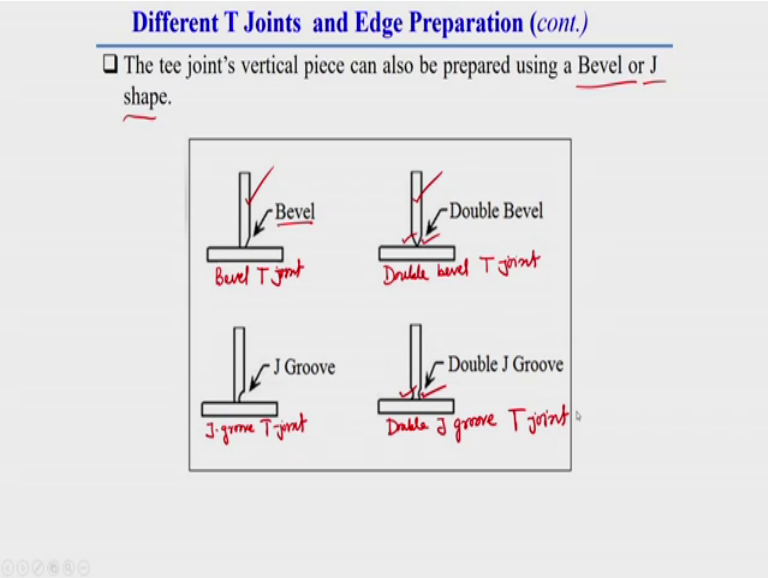

Now, different types of T joints here is explained, generally this T joint vertical piece can also be prepared using a Bevel or J shape. Like, if the bevel shape is made then this is called Bevel T joint, this is called bevel T joint, because here these vertical piece edge preparation is done in a type of bevel shape that is why it is called bevel T joint. If both the side bevel is made on this vertical piece, then this is called double bevel T joint. Because, here you see this side and this side both the side generally bevel is made. If, in a vertical piece J shape is made or J groove is made, then that is called J groove T joint. And, if these J groove is made both the side of these vertical piece, then that is called double J groove T joint.

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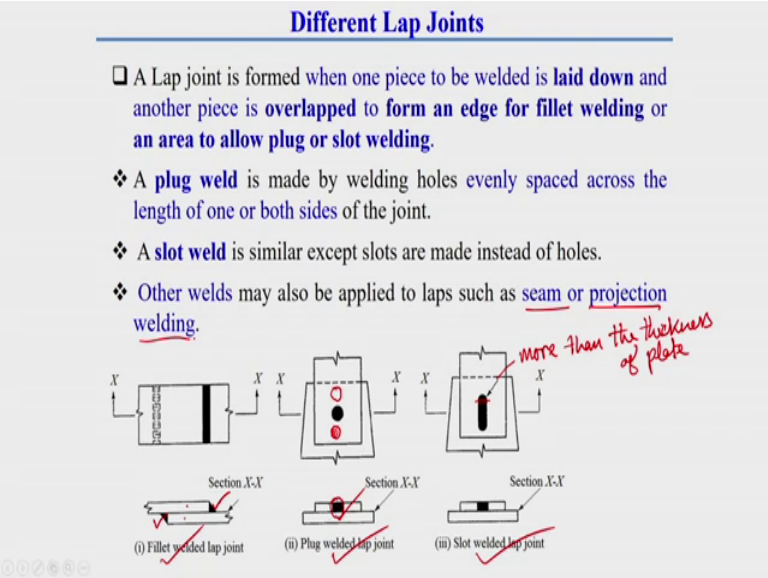

Now, different types of Lap joints, now first of all you should know what is lap joint a lap joint is formed when one piece to be welded is laid down, and another piece is overlap to form an edge for fillet welding or an area to allow plug or slot welding that means, here this; that means, here the pieces of 2 material plate put together and overlap each other. So, here generally this lap welding can be 3 different categories. Depending upon this joining process generally these lap welding joint can be 3 different categories, it can be fillet type fillet welded lap joint, it can be plug welded lap joint, or it can be slot welded lap joint.

In case of fillet welded lap joint here in case of overlap fillet, fillet welding; that means, triangular shape welding is done. Here you see this side and this side generally whatever the welding let this 2 plate this is one plate this is another plate these 2 plate is overlapped each other. So, at the edge here generally for welding there is a edge. In this edge generally what happens a triangular shape welding is done. So, it is generally called fillet welding that is why this is called fillet welded lap joint. This lap joint also can be done by plug welding also.

A plug weld is made by welding holes evenly spaced across the length of the length of one or both sides of the joint that means, a flag plug weld is made by welding holes evenly as spaced across the length of one or both side of the joint; that means, this plug welding is done by putting hole like here you put a hole top surface of the here you see

this plate this one plate this is another plate. So, these top plate is overlapped with this bottom plate.

Now, here generally what happens there can be different types of hole like this, it can be placed evenly or this evenly placed hole after that what happens here generally filler material is deposited. Once, you take the cross section of these joint we can get the cross section view of the joint like this; that means, this is the generally filler material which is deposited, due to these things joined together.

This lap joint also can be another categories like slot welding. Here, generally instead of putting a hole there is make a slot. Now, here one things we should keep it in mind at the end of this slot, this should be either semi-circular or this semi-circular radius should be more than thickness of the thickness of the plate. This whatever the radius here we should use this radius should be more than the thickness of the plate thickness of plate.

So, the difference between plug and slot welding in case of plug welding generally there is there is put a circular hole whereas, in slot welding generally there put a slot. Apart from this thing, other weld may also be applied in lap joint such as seam or projection types of welding.

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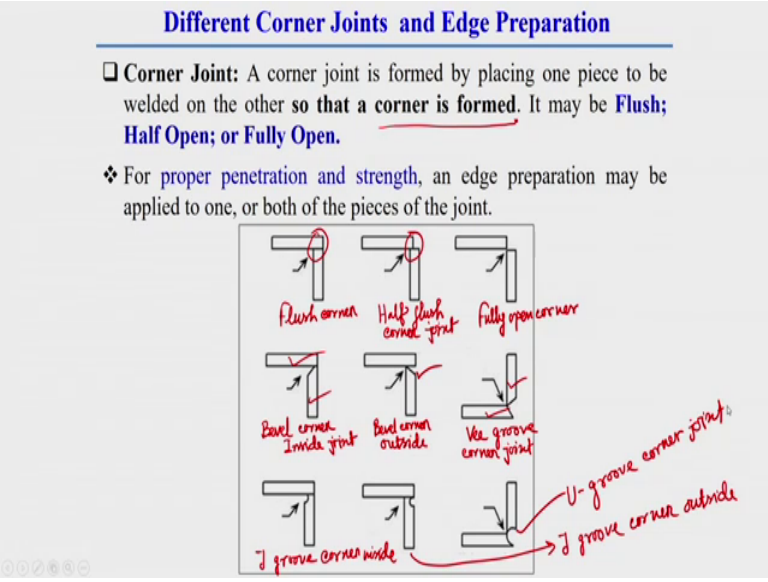

Now, different types of corner joint and their edge preparation, this corner joint also can be the corner joint we can define a corner joint is formed by placing one piece to be

welded on the other. So, that a corner is formed here you see. So, that a corner is formed. It may be flush half open or fully open categories.

For proper penetration and a strength for proper penetration and a strength an edge preparation may be applied to one or both of the piece of the joint. For proper penetration and a strength and edge preparation may be applied to one or both of the piece of the weld. Here you see there is different categories of there is different categories of corner joint is there, where generally a corner joint is formed by placing one piece to be welded on the other. So, that a corner here is formed everywhere there is formed a corner.

Now, you see this corner joint depending upon it is edge preparation also can be different types. This corner joint here you see this first one is called flush corner joint this is called flush corner joint. This second one is called half flush corner joint, half flush corner joint. Here generally this third one is called fully open corner joint, it is called fully open corner. Because, this corner is generally open, here this corner is half open; here this corner is fully closed that is why this is called flush corner joint.

Now, depending upon this as edge preparation you see this edge preparation we can make either one piece of this plate or both the piece of the plate like both the piece of the plate. Now, here this in this category in this category the name of this categories is bevel corner inside, these categories welding is bevel corner inside joint. Here, this bevel is made outside of the plate that is why this is called bevel corner bevel corner outside. Here generally a V ship V shape is made that is why is it is called Vee groove corner joint; you see these all are different categories of corner joint.

So, every joint these 5 different categories of joint which I have already told you. So, these 5 different categories also have different different, other categories depending upon it is edge preparation. This one is called J groove corner inside, J groove corner here are these J groove is mode made inside, that is why it is called J groove corner inside joint. Here, the G J groove is made outside that is why this is called J groove corner, corner outside joint. And, this one is called U groove corner joint here U shape is made that is why it is called U groove corner joint.

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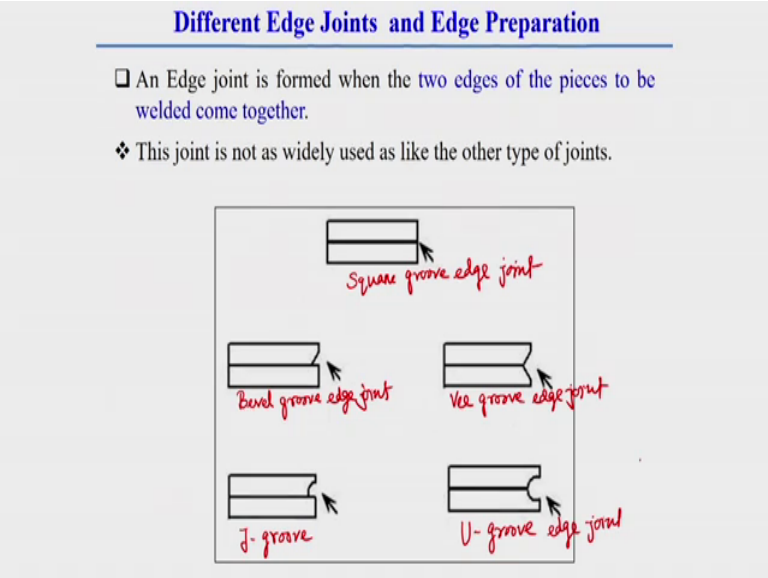

Now, these are the different categories of these are the different categories of edge joint and their edge preparation. And, edge joint is formed when the 2 edge of the piece to be welded come together; that means, at edge a an edge joint is formed when the 2 edges of the pieces to be welded come together. These joint is not widely used as like other welding process like be butt, corner or a T joint generally these are the welding for these are the joining processes, which is which are widely used, but this corner edge joint generally very rarely used. Like here you see this first categories as there is no edge preparation is made that is why this category joint name is a square groove edge joint a square groove edge joint.

This second categories these categories is called as bevel is made in one play one plate or on piece of material, that is why it is called bevel groove edge joint. So, here will be the edged edge term; that means, edge joint term. This will be Vee groove edge joint. Here as J groove is made that is why is called J groove edge joint; edge joint as here the U groove is made that is why it is called you groove edge joint. These are all different categories of weld joint and their edge preparation. These are the very important things which is very much essential once you will be in industry.

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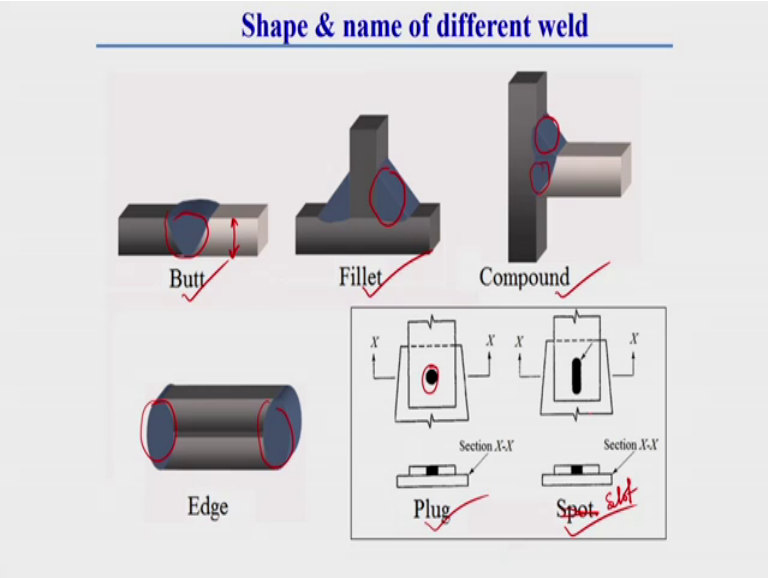

Now, here these are all joint you have seen now we will see what are the shape of weld of all these joint? The shape of the weld can be butt weld, the shape of the weld can be plate welding plate weld, or the shape of the weld can be compound weld. So, butt weld is done along the thickness direction of the plate whereas, the fillet welding which is resemble triangular in shape, which I have already explained. And, if in a structure there is a combination of 2 or 3 different types of welding weld are there, then that weld is called compound weld. Here you see here both butt as well as fillet welding part is there that is why this is called compound weld.

So, there can be edge weld whose shape is look like this, then I will this weld is put at the edge of the plate. And, I have already explained about plug welding and a spot welding also, plug welding here the shape of the weld once you see the side view which is look like this. And, once we see the spot welding which is look like this, but in case of plug weld generally there is made a circular hole and in case of plug weld generally in case of a spot weld, generally there is put sorry this is generally slot weld actually slot not a spot weld. This is generally slot weld here generally instead of putting a circular hole, here generally put a slot and with round shape at the edge of that slot.

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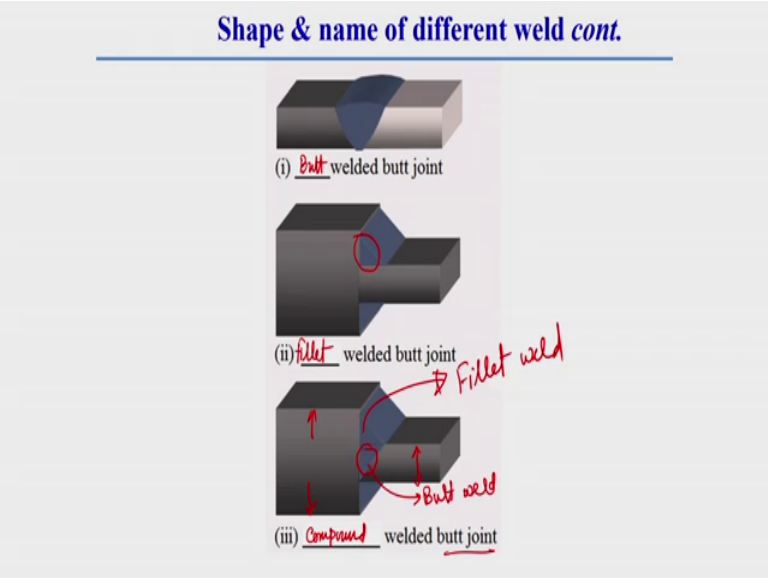

Now, we will see what is the name of different types of butt weld and their joint? Here, you see this once we go for filling these gap, these name what should be the name of this what we should write in this gap, that we should know. Like shape and name of different types of weld. Here, you see as the butt welding is done in butt joint butt welding is done in butt joint that is why this name is here this name of should be butt welded butt joint. Here in case of butt joint as the triangular shape weld is made or that fillet welding is made, that is why it is called fillet welded butt joint.

In this in this case 2 different thicknesses plate side by side; that means, 2 different plate laid side by side this is one thickness bigger thickness of plate this is another smaller thickness of plate puts side by side. So, here generally 2 different types of weld is made here; one is generally butt joint and this one is generally butt weld. And, this triangular shape outside of the thickness generally here this is called generally fillet weld these are all weld. So, as these 2 different types of weld put together that is why in case of butt joint has these 2 different types of weld put together that is why this is called compound welded butt joint. So, here this weld which we made here this is this is generally compound welded butt joint.

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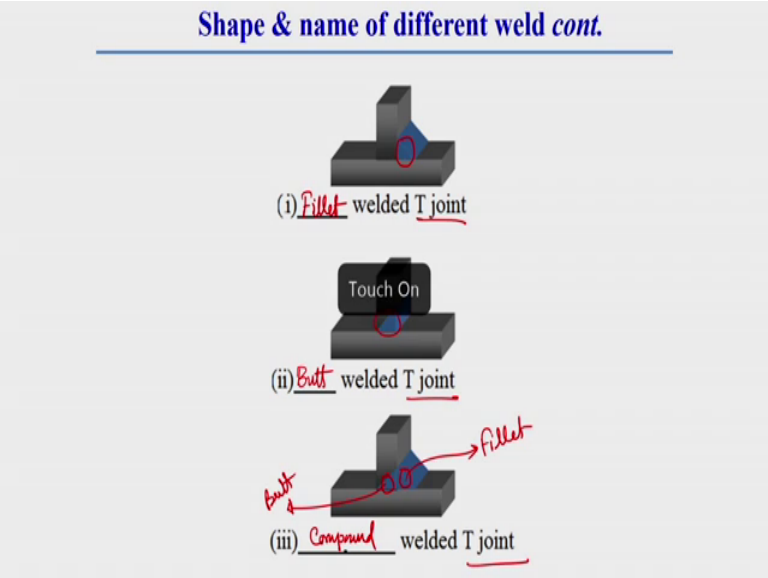

Now, similarly for T joint also here the weld which we made which is triangular in nature. And, that is why this is called generally this triangular shaped weld is called T fillet weld that is why this in this in this gap we should write the fillet welded T joint. So, this is a type of fillet welded what types of joint this is T joint, that is why it is written like this.

So, this is generally welding is done along the thickness of this plate that is why this is called butt welded T joint and a T is from that is why it is called T joint. As it is a T joint, this all are T joint that is why this is called T joint. And, here both fillet as well as butt generally we do it both this is generally fillet weld and this is generally butt weld as here we made, that is why this is called as combination of 2 different types of weld is there, that is why it is called compound welded what types of joint, this weld joint is T joint that is why it is called compound welded T joint.

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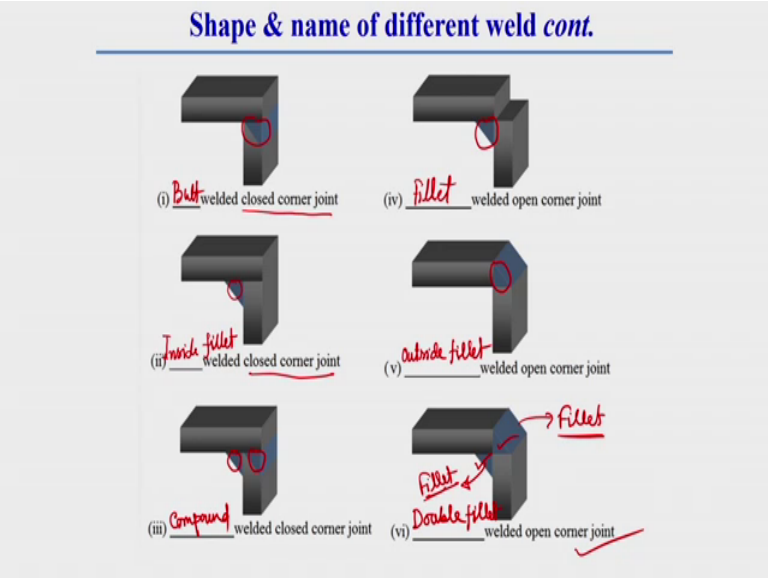

Now, here there these are the different shape and it is name for corner joint also that this can be different shape and it is name also. For corner joint also we can put different weld name, we can have different weld also here. In case of corner joint also we can have different types of weld name. Like this first one here generally the welding is made along the thickness of the plate that is why this is called butt welded closed corner butt welded here butt weld is done. For what types of C A joint close corner joint, that I have already explained in details in categories of corners joint what is closed corner joint? But, here what types of weld we made here the weld we made that is butt type that is why it is called butt welded closed corner joint.

In this case generally here generally we made a fillet weld. And, this joint is open corner joint this open corner joint I have already explained previously in the categories of corner joint all categories of corner joint. So, that is why the name of this weld joint should be the name of this weld joint should be fillet welded corner joint.

Similarly, here generally this fillet is done in case of a corner close corner joint. Here general this fillet welding is done in case of a close corner joint that is why the name of this welding will be fillet welded close corner joint. Here generally another this fillet is done generally inside, as this in this case as the fillet is done inside that is why it is called inside fillet inside fillet welded closed corner joint. Here this weld is fillet is done outside the joint that is why this has a name which is called outside fillet welded corner joint.

Now, here both butt as well as fillet welding is done in case of closed corner joint, that is why the name of this welding is compound welded closed corner joint. Here you see this plate is put and which make a closed corner. Here also you see both inside and outside fillet is made here, that is why here this is one types of weld is made. Here there here there is not there is not 2 type of weld, that is why as here one types of weld is made that is fillet weld. This is also fillet weld type and this is also type of fillet.

So, here generally there is not 2 different types of weld, that is why this is not a compound welded open corner joint. This name the name of as 2 different fillet welding is done here, that is why it is name is double fillet double fillet welded corner joint.

Now, this is very important because you see once we will be in industry, generally we will be given some sort of drawing and there will be written or some shot some sort of data sheet they will provide us, and what happens there will be written some sort of name like this. Like butt welded close corner joint we have to do or fillet welded open corner joint we have to do. If there will be written like this to see the name or to see this data sheet itself we can do all types of OS edge preparation and all types of welding also we can do, according to their data sheet, if we know the all nomenclature of different welding joint. Actually, if we know the different welding joint and weld, weld name then what happens we can easily be able to do that work very easy way easily.

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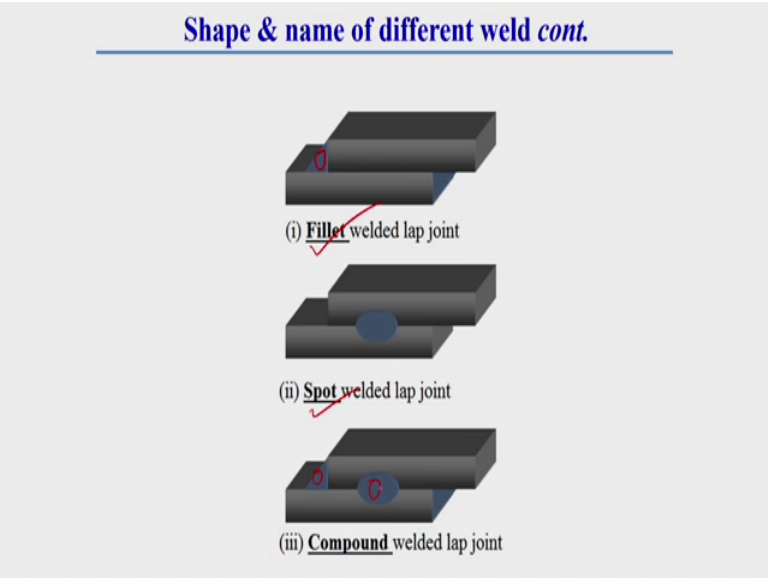

Now, here you see these are the different shape of lap joint. Here, you see here generally fillet welding is done, this is a fillet welding is done, that is why this is called fillet welded lap joint. Here, generally a spot welding is done that is why is called the spot welded lap joint. Here both fillet as well as a spot welding is done, here you see this triangular shape weld as well as this spot weld shape also we made, that is why this is called compound welded lap joint.

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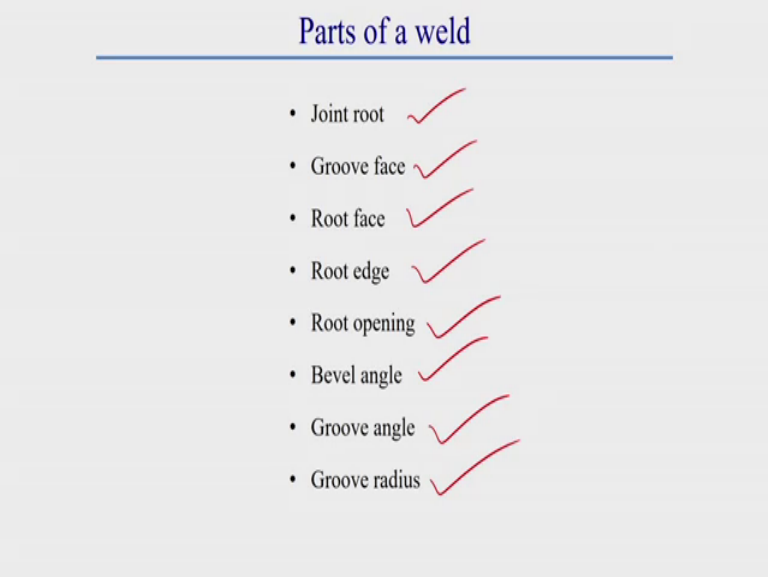

Now, different part of a joint, we have already discussed about different types different categories of welding process, different categories of welding joint, different type of weld and different types of welded joint that we have explained in details. Now, we will go to what are the different important part of a welds are there? In a welding there are 8 different parts are there, that elements are like joint root, groove face, root face, root edge, root opening, bevel angle, groove angle, and groove radius. This detail parts of this detail part of a welded joint I will explain in next lecture.