Govt. & UGC Approved

UNIVERSITY OF GLOBAL VILLAGE (UGV), BARISHAL

THE UNIVERSITY FOR HI-TECH AND HUMANITY

Welding and Carpentry

Shop Sessional

Content of Laboratory Course

Prepared By

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University of Global Village (UGV), Barishal

Program: B.Sc. in Civil Engineering

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BASIC COURSE INFORMATION

Course Title	Welding and Carpentry Shop
Course Code	CE 0732-1200
Credits	01
CIE Marks	30
SEE Marks	20
Exam Hours	2 hours (Semester Final Exam)
Level	2nd Semester

Welding and Carpentry Shop Sessional

COURSE CODE: CE 0732-1200

CREDIT: 01

CIE MARKS: 30

SEE MARKS: 20

CLO 01 **Apply** the various procedures and techniques for the experiments of joint, electrode, gas welding, basics of soldering and timbering..
CLO 02 **Develop** intellectual communication skills through working in groups in performing the laboratory experiments and by interpreting the experimental results.
CLO 03 **Learn** the writing techniques of lab report in a systematic way.

Sl.	Course Contents	Hours	CLOs
1	Introduction to welding -**foundational overview** of welding processes, techniques, safety practices, and applications in various industries.	10	CLO 1, CLO 3
2	Details about different types of welding joints -A **study** of butt, lap, corner, tee, edge, and scarf joints, including their applications and advantages/disadvantages.	11	CLO1,CLO 3
3	Details of butt Joint Welding by gas, electrode welding. -**Principles of butt** joint preparation, gas welding techniques (oxy-acetylene, oxy-fuel), electrode welding processes (SMAW, GMAW, GTAW), weld quality assessment, safety practices, and applications in various industries.	10	CLO1,CLO2,CLO 3
4	Details of Lap Joint Welding by gas, electrode welding -**Lap Joint Welding** is a welding process where two overlapping metal pieces are joined together by applying heat and filler material. This process is commonly used in various industries for its simplicity and versatility.	10	CLO1,CLO2,CLO 3

4	Details of Corner Joint Welding by gas, electrode welding -**Corner** Joint Welding: Principles, techniques, and applications of gas welding (oxy-acetylene) and electrode (arc) welding processes for creating strong and durable corner joints in various materials.	**10**	**CLO1,CLO2,CLO 3**
5	Basics of Welding, Soldering and Brazing -**Principles, techniques, applications**, and safety considerations of joining metals using heat and filler materials with varying melting temperatures.	9	CLO1,CLO 3
6	Timbering -The **study and application** of supporting structures (timber, steel, or concrete) to stabilize excavations, tunnels, and underground structures to prevent collapse and ensure worker safety	9	CLO2,CLO 3

7	Wood Furnish Operation -**Principles** and practices of wood furnishing, including wood selection, design, manufacturing processes (e.g., joinery, finishing), and project management for creating functional and aesthetically pleasing furniture pieces."	**8**	**CLO2,CLO 3**
8	Seasoning of timber -**Study** of methods to remove excess moisture from timber to improve its strength, durability, and dimensional stability, including natural air drying, kiln drying, and solar drying.	8	CLO2,CLO 3

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ASSESSMENT PATTERN

CIE- Continuous Internal Evaluation (30 Marks)

SEE- Semester End Examination (20 Marks)

SEE- Semester End Examination (40 Marks) (should be converted in actual marks (20))

Bloom's Category	Tests
Remember	**05**
Understand	**07**
Apply	**08**
Analyze	**07**
Evaluate	**08**
Create	**05**

CIE- Continuous Internal Evaluation (100 Marks) (should be converted in actual marks (30))

Bloom's Category Marks (out of 100)	Lab Final (30)	Lab Report (10)	**Continuous lab performance** (30)	Presentation & Viva (10)	External Participation in Curricular/**Final Project Exhibition** (10)
Remember/**Imitation**	05		05	02	
Understand/**manipulation**	05	05	05	03	
Apply/**Precision**	05		05		Attendance
Analyze/**Articulation**	05		05		10
Evaluate/**Naturalisation**	05	05	05		
Create	05		05	05	

Week	Topic	Teaching Learning Strategy	Assessment Strategy	CLOs
1,2	Introduction to welding, Details about different types of welding joints	Lecture, Oral presentation	Lab Test, Quiz and Report	CLO 1, CLO 3
3	Details of butt Joint Welding by gas, electrode welding.	Lecture, Discussion	Lab Test, Quiz and Report	CLO 1, CLO 3
4	Details of Lap Joint Welding by gas, electrode welding	Lecture, Discussion	Lab Test, Quiz and Report	CLO1,CLO2,CLO3
5	Details of Corner Joint Welding by gas, electrode welding	Lecture, Discussion	Lab Test, Quiz and Report	CLO1,CLO2,CLO3
6	Basics of Welding, Soldering and Brazing	Lecture, Discussion	Lab Test, Quiz and Report	CLO1,CLO 3
7,8	Timbering	Lecture, Discussion	Lab Test, Quiz and Report	CLO2,CLO 3
9	Wood Furnish Operation	Lecture, Discussion	Lab Test, Quiz and Report	CLO2,CLO 3

10-11	**Seasoning of timber**	Lecture, Discussion	Lab Test, Quiz and Report	**CLO2,CLO 3**
12,13	**Practice, Review/Reserved Day**	Lecture, Discussion	Lab Test, Quiz and Report	CLO 4
14,15	Lab Report Assessment, Self study	Lecture, Discussion	Lab Test, Quiz and Report	CLO 4
16,17	Lab Test, Viva, Quiz, Overall Assessment, Skill Development Test (Competency)	Lecture, Discussion	Lab Test, Quiz and Report	CLO 4

References

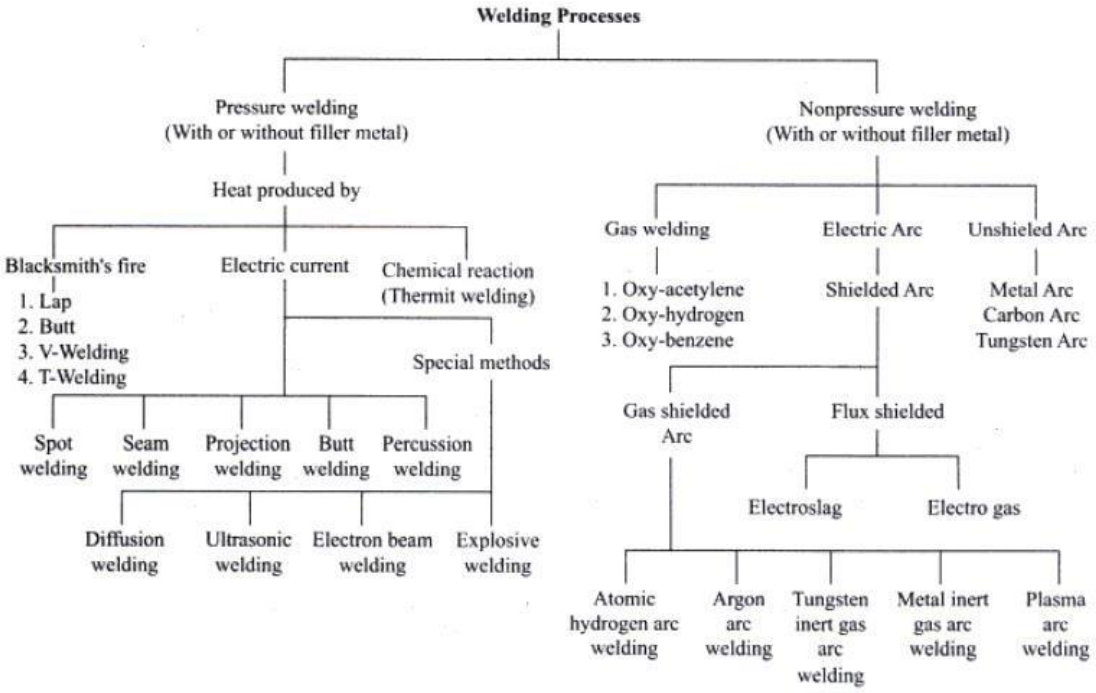
1. "**Welding Handbook**" by the American Welding Society (AWS)
2. "**Principles of Metalworking**" by Louis T. Sharp
3. "**The Woodworker's Handbook**" by R.J. De Cristoforo
4. "**Understanding Wood: A Craftsman's Guide to Wood Technology**" by R. Bruce Hoadley

Introduction to welding, Details about different types of welding joints
Week 1-2

WELDING

Welding is a process for joining two similar or dissimilar metals by fusion. It joins different metals/alloys, with or without the application of pressure and with or without the use of filler metal. The fusion of metal takes place by means of heat. The heat may be generated either from combustion of gases, electric arc, electric resistance or by chemical reaction.

Welding provides a permanent joint but it normally affects the metallurgy of the components. It is therefore usually accompanied by post weld heat treatment for most of the critical components. The welding is widely used as a fabrication and repairing process in industries. Some of the typical applications of welding include the fabrication of ships, pressure vessels, automobile bodies, off-shore platform, bridges, welded pipes, sealing of nuclear fuel and explosives, etc.



Most of the metals and alloys can be welded by one type of welding process or the other. However, some are easier to weld than others. To compare this ease in welding term 'weldability' is often used. The weldability may be defined as property of a metal which indicates the ease with which it can be welded with other similar or dissimilar metals.

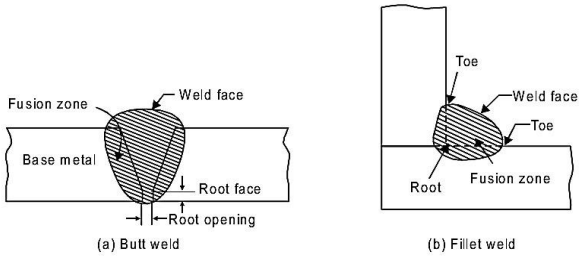


Fig. 17.1 Terminological elements of welding process

Elements of welding process used with common welding joints such as base metal, fusion zone, weld face, root face, root opening toe and root are depicted in Figure.

Edge preparations

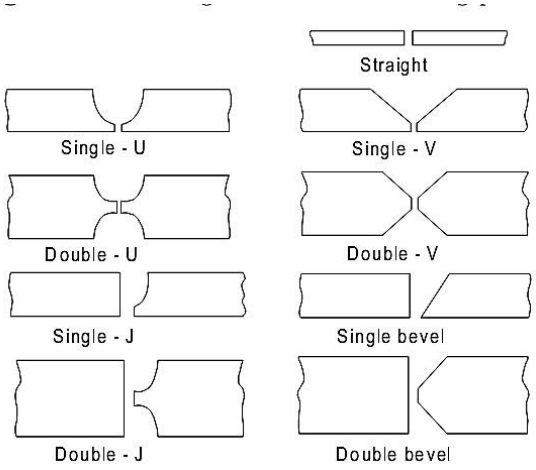
For welding the edges of joining surfaces of metals are prepared first. Different edge preparations may be used for welding butt joints, which are given in Figure.

Welding joints

Some common welding joints are shown in Figure. Welding joints are of generally of two major kinds namely lap joint and butt joint. The main types are described as under.

1. **Lap weld joint Single-Lap Joint**

This joint, made by overlapping the edges of the plate, is not recommended for most work. The single lap has very little resistance to bending. It can be used satisfactorily for joining two cylinders that fit inside one another.



Double-Lap Joint

This is stronger than the single-lap joint but has the disadvantage that it requires twice as much welding.

Tee Fillet Weld

This type of joint, although widely used, should not be employed if an alternative design is possible.

2. Butt weld joint a. Single-Vee Butt Weld

It is used for plates up to 15.8 mm thick. The angle of the vee depends upon the technique being used, the plates being spaced approximately 3.2 mm.

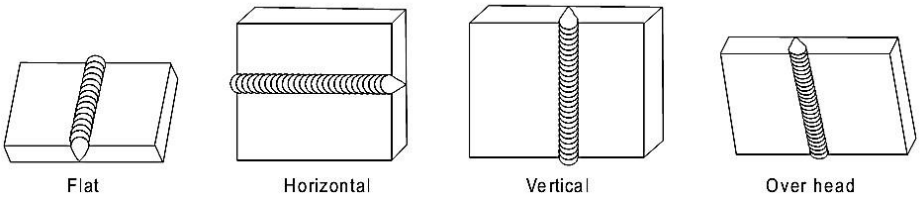
b. Double-Vee Butt Weld

It is used for plates over 13 mm thick when the welding can be performed on both sides of the plate. The top vee angle is either 60° or 80°, while the bottom angle is 80°, depending on the technique being used.

Welding Positions

As shown in Fig. 17.4, there are four types of welding positions, which are given as:

a. Flat or down hand position
b. Horizontal position c. Vertical position
d. Overhead position



Flat or Down-hand Welding Position

The flat position or down hand position is one in which the welding is performed from the upper side of the joint and the face of the weld is approximately horizontal.

Horizontal Welding Position

In horizontal position, the plane of the workpiece is vertical and the deposited weld head is horizontal. This position of welding is most commonly used in welding vessels and reservoirs.

Vertical Welding Position

In vertical position, the plane of the work-piece is vertical and the weld is deposited upon a vertical surface. It is difficult to produce satisfactory welds in this position due to the effect of the force of gravity on the molten metal.

Overhead Welding Position

The overhead position is probably even more difficult to weld than the vertical position. Here the pull of gravity against the molten metal is much greater.

ARC WELDING PROCESSES

The process, in which an electric arc between an electrode and a work-piece or between two electrodes is utilized to weld base metals, is called an arc welding process. The basic principle of arc welding is shown in Figure1. However the basic elements involved in arc welding process are shown in Figure2. Most of these processes use some shielding gas while others employ coatings or fluxes to prevent the weld pool from the surrounding atmosphere.

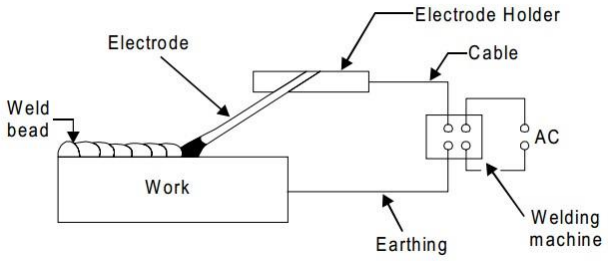


Fig1.The basic principle of arc welding

1) Switch box.
2) Secondary terminals
3) Welding machine.
4) Current reading scale.
5) Current regulating hand wheel.
6) Leather apron.
7) Asbestos hand gloves.
8) Protective glasses strap
9) Electrode holder.
10) Hand shield
11) Channel for cable protection.
12) Welding cable.
13) Chipping hammer.
14) Wire brush.
15) Earth clamp.
16) Welding table (metallic).
17) Job.

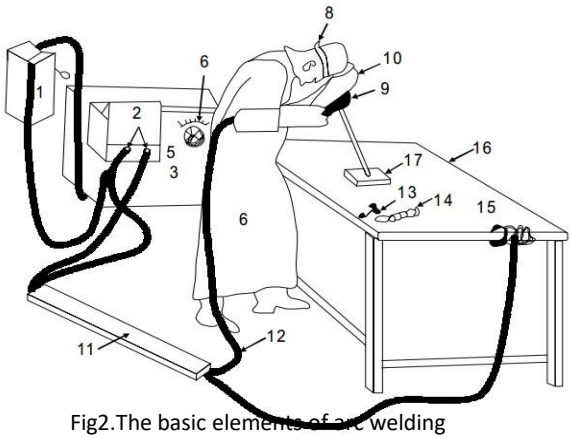


Fig2.The basic elements of arc welding

Arc Welding Equipment

Arc welding equipment, setup and related tools and accessories are shown in Figure. However some common tools of arc welding are shown separately through Figure. Few of the important components of arc welding setup are described as under.

1. Arc welding power source

Both direct current (DC) and alternating current (AC) are used for electric arc welding, each having its particular applications. DC welding supply is usually obtained from generators driven by electric motor or if no electricity is available by internal combustion engines. For AC welding supply, transformers are predominantly used for almost all Arc-welding where mains electricity supply is available. They have to step down the usual supply voltage (200-400 volts) to the normal open circuit welding voltage (50-90 volts). The following factors influence the selection of a power source:

a. Type of electrodes to be used and metals to be welded
b. Available power source (AC or DC)
c. Required output
d. Duty cycle
e. Efficiency
f. Initial costs and running costs
g. Available floor space
h. Versatility of equipment

2. Welding cables

Welding cables are required for conduction of current from the power source through the electrode holder, the arc, the work piece and back to the welding power source. These are insulated copper or aluminum cables.

3. Electrode holder

Electrode holder is used for holding the electrode manually and conducting current to it. These are usually matched to the size of the lead, which in turn matched to the amperage output of the arc welder. Electrode holders are available in sizes that range from 150 to 500 Amps.

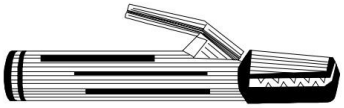


Fig. Electrode Holder

4. Welding Electrodes

An electrode is a piece of wire or a rod of a metal or alloy, with or without coatings. An arc is set up between electrode and workpiece. Welding electrodes are classified into following types-

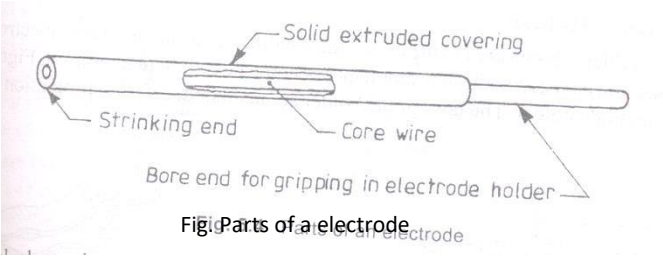


Fig. Parts of a electrode

(i) Consumable Electrodes
(a) Bare Electrodes
(b) Coated Electrodes
(ii) Non-consumable Electrodes
(a) Carbon or Graphite Electrodes
(b) Tungsten Electrodes

Consumable electrode is made of different metals and their alloys. The end of this electrode starts melting when arc is struck between the electrode and workpiece. Thus consumable electrode itself acts as a filler metal. Bare electrodes consist of a metal or alloy wire without any flux coating on them. Coated electrodes have flux coating which starts melting as soon as an electric arc is struck. This coating on melting performs many functions like prevention of joint from atmospheric contamination, arc stabilizers etc.

Non-consumable electrodes are made up of high melting point materials like carbon, pure tungsten or alloy tungsten etc. These electrodes do not melt away during welding. But practically, the electrode length goes on decreasing with the passage of time, because of oxidation and vaporization of the electrode material during welding. The materials of non-consumable electrodes are usually copper coated carbon or graphite, pure tungsten, thoriated or zirconiated tungsten.

5. Hand Screen

Hand screen used for protection of eyes and supervision of weld bead.

6. Chipping hammer

Chipping Hammer is used to remove the slag by striking.

7. Wire brush

Wire brush is used to clean the surface to be weld.

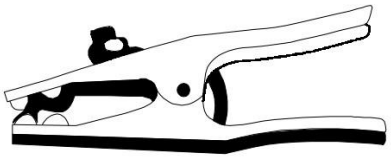


Fig. 17.11 Earth clamp

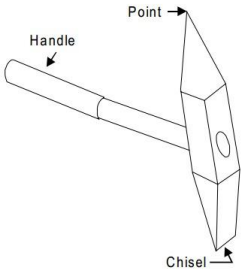


Fig. 17.13 Chipping and hammer

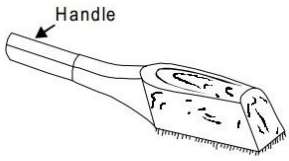


Fig. 17.14 Wire brush

8. Protective clothing

Operator wears the protective clothing such as apron to keep away the exposure of direct heat to the body.

Safety Recommendations for ARC Welding

The beginner in the field of arc welding must go through and become familiar with these general safety recommendations which are given as under.

1. The body or the frame of the welding machine shall be efficiently earthed. Pipe lines containing gases or inflammable liquids or conduits carrying electrical conductors shall not be used for a ground return circuit All earth connections shall be mechanically strong and electrically adequate for the required current.

Details of butt Joint Welding by gas, electrode welding. Week 3

2. Welding arc in addition to being very is a source of infra-red and ultra-violet light also; consequently the operator must use either helmet or a hand-shield fitted with a special filter glass to protect eyes
3. Excess ultra-violet light can cause an effect similar to sunburn on the skin of the welder
4. The welder's body and clothing are protected from radiation and burns caused by sparks and flying globules of molten metal with the help of the following:
5. Gloves protect the hands of a welder.
6. Leather or asbestos apron is very useful to protect welder's clothes and his trunk and thighs while seated he is doing welding.
7. For overhead welding, some form of protection for the head is required
8. Leather skull cap or peaked cap will do the needful.
9. Leather jackets and 1ather leggings are also available as clothes for body protection.
10. Welding equipment shall be inspected periodically and maintained in safe working order at all times.
11. Arc welding machines should be of suitable quality.
12. All parts of welding set shall be suitably enclosed and protected to meet the usual service conditions.

EXPT NO: 01 **BUTT JOINT**

Aim: To make a Butt joint using the given two M.S pieces by arc welding.

Material Required:

Mild steel plate of size 100X50X5 mm – 2 No's

Welding Electrodes: M.S electrodes 3.1 mm X350 mm

Welding Equipment: Air cooled transformer
Voltage-80 to 600 V 3 phase supply, amps up to 350

Tools and Accessories required:

1. Rough and smooth files.
2. Protractor
3. Arc welding machine (transformer type)
4. Mild steel electrode and electrode holder
5. Ground clamp
6. Tongs
7. Face shield
8. Apron
9. Chipping hammer.

Sequence of operations:

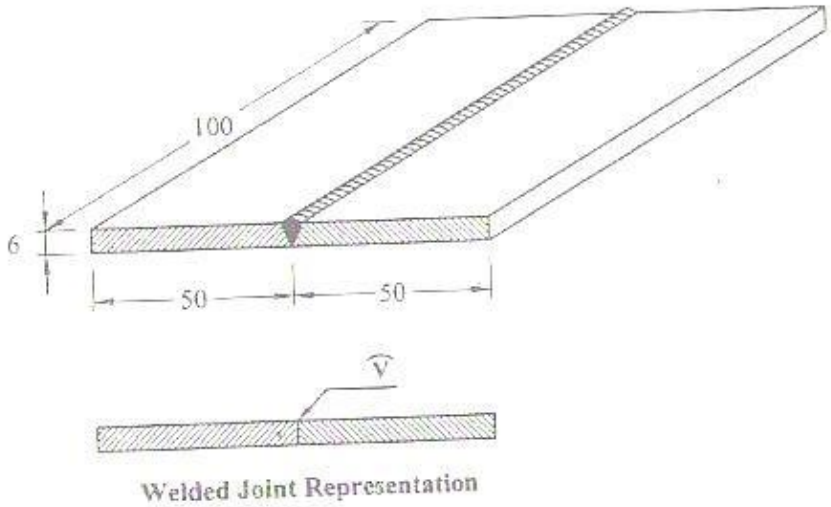
1. Marking
2. Cutting
3. Edge preparation (Removal of rust, scale etc.) by filling
4. Try square leveling
5. Tacking
6. Welding
7. Cooling
8. Chipping
9. Cleaning

Procedure:

1. The given M.S pieces are thoroughly cleaned of rust and scale.
2. One edge of each piece is believed, to an angle of 30^0, leaving nearly ¼ th of the flat thickness, at one end.
3. The two pieces are positioned on the welding table such that, they are separated slightly for better penetration of the weld.
4. The electrode is fitted in the electrode holder and the welding current is ser to be a proper value.
5. The ground clamp is fastened to the welding table.
6. Wearing the apron and using the face shield, the arc is struck and holding the two pieces together; first run of the weld is done to fill the root gap.
7. Second run of the weld is done with proper weaving and with uniform movement. During the process of welding, the electrode is kept at 15^0 to 25^0 from vertical and in the direction of welding.
8. The scale formation on the welds is removed by using the chipping hammer.
9. Filling is done to remove any spanner around the weld.

DRAWING:

Details of Lap Joint Welding by gas electrode welding
Week 4



Welded Joint Representation

Result:

The single V-butt joint is thus made, using the tools and equipment as mentioned above.

EXPT NO: 02 **LAP JOINT**

Aim: To make a Lap joint, using the given two M.S pieces and by arc welding.

Material Supplied:

Mild steel plate of size 100X50X5 mm – 2 No's

Welding Electrodes: M.S electrodes 3.1 mm X350 mm

Welding Equipment: Air cooled transformer
Voltage-80 to 600 V,3-ϕ supply, Current up to 350Amps

Tools and Accessories required:

1. Rough and smooth files.
2. Protractor
3. Arc welding machine (transformer type)
4. Mild steel electrode and electrode holder
5. Ground clamp
6. Tongs
7. Face shield
8. Apron
9. Chipping hammer.

Sequence of operations:

1. Marking
2. Cutting
3. Edge preparation (Removal of rust, scale etc.) by filling
4. Try square leveling
5. Tacking
6. Welding
7. Cooling
8. Chipping
9. Cleaning

Procedure:

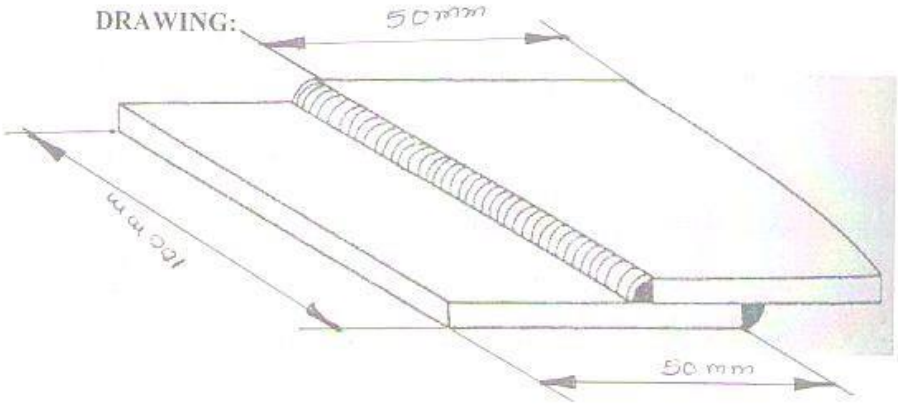
1. The given M.S pieces are thoroughly cleaned of rust and scale.
2. The two pieces are positioned on the welding table such that, the two pieces overlapped one over the other as shown in drawing.
3. The electrode is fitted in the electrode holder and the welding current is ser to be a proper value.
4. The ground clamp is fastened to the welding table.
5. Wearing the apron and using the face shield, the arc is struck and the work pieces are tackwelded at both the ends and at the centre of the joint.
6. The alignment of the lap joint is checked and the tack-welded pieces are required.
7. The scale formation on the welds is removed by using the chipping hammer.
8. Filling is done to remove any spanner around the weld.

DRAWING:

Details of Corner Joint Welding by gas, electrode welding

Week 5

DRAWING:



Result:

The Lap joint is thus made, using the tools and equipment as mentioned

EXPT NO: 03 **CORNER JOINT**

Aim: To make a corner joint, using the given two M.S pieces and by arc welding.

Material Supplied:

Mild steel plate of size 100X50X5 mm – 2 No's

Welding Electrodes: M.S electrodes 3.1 mm X350 mm

Welding Equipment: Air cooled transformer
Voltage-80 to 600 V 3 phase supply, amps up to 350

Tools and Accessories required:

1. Rough and smooth files.
2. Protractor
3. Arc welding machine (transformer type)
4. Mild steel electrode and electrode holder
5. Ground clamp
6. Tongs
7. Face shield
8. Apron
9. Chipping hammer.

Sequence of operations:

1. Marking
2. Cutting
3. Edge preparation (Removal of rust, scale etc.) by filling
4. Try square leveling
5. Tacking
6. Welding
7. Cooling
8. Chipping
9. Cleaning

Procedure:

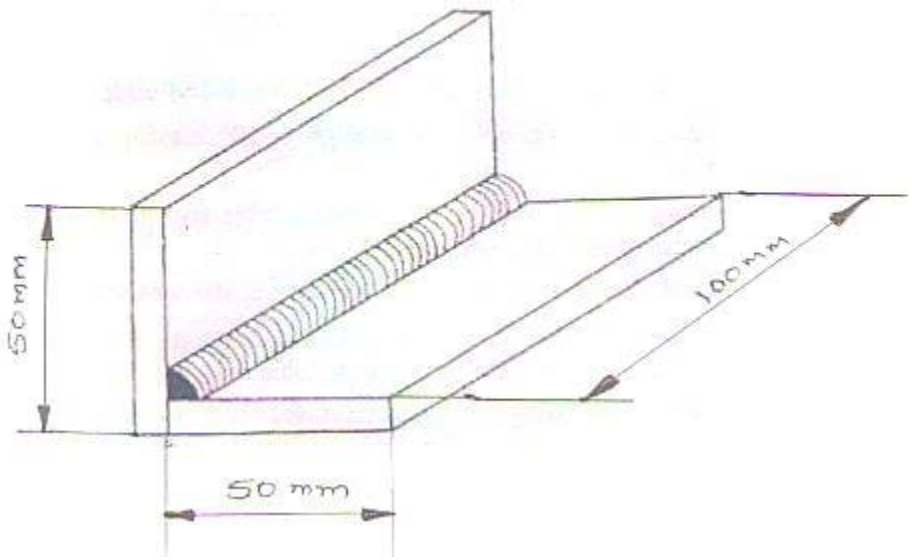
1. The given M.S pieces are thoroughly cleaned of rust and scale.
2. The two pieces are positioned on the welding table such that, the L shape is formed. The tongs are made use of for the purpose.
3. The electrode is fitted in the electrode holder and the welding current is ser to be a proper value.
4. The ground clamp is fastened to the welding table.
5. Wearing the apron and using the face shield, the arc is struck and the work pieces are tackwelded at both the ends and at the centre of the joint.
6. The alignment of the corner joint is checked and the tack-welded pieces are required.
7. The scale formation on the welds is removed by using the chipping hammer.
8. Filling is done to remove any spanner around the weld.

Basics of Welding,

Soldering and Brazing

Week 6

DRAWING:



Result: The corner joint is thus made, using the tools and equipment as mentioned

Basics of Welding, Soldering and Brazing

Welding:

Definition: A process that creates a permanent joint by melting the base metals and often adding a filler metal to form a strong metallurgical bond.

Temperatures: Reaches melting point of base metals (typically above 2,000°F / 1,093°C).

Applications: High-strength applications in construction, fabrication, machinery, pressure vessels, and piping systems.

Brazing:

Definition: A process that joins metals using a filler metal with a lower melting point than the base metals. The filler metal melts and flows into the joint, creating a strong, somewhat permanent bond.

Temperatures: Lower than welding but higher than soldering (typically above 840°F / 450°C).

Applications: Joining dissimilar metals, plumbing applications (e.g., radiators, pipes), creating leak-proof connections, and applications requiring some strength but not the extreme strength of welding.

Soldering:

Definition: A process that joins metals using a filler metal alloy with a much lower melting point than the base metals. The solder melts and flows into the joint, creating a weaker, but often electrically conductive, joint.

Temperatures: Lowest of the three processes (below 840°F / 450°C).

Applications: Electronics (creating electrical connections), joining thin or delicate metal pieces, applications where high strength is not required.

Difference among Welding, Soldering, and Brazing

Aspect	Welding	Soldering	Brazing
Definition	Joining materials by melting base materials	Joining materials using a filler metal with lower melting point than base materials	Joining materials using a filler metal with lower melting point than base materials
Temperature	Very high (above melting point of base materials)	Low (below 450°C / 842°F)	Moderate (above 450°C / 842°F but below melting point of base materials)
Materials	Usually similar metals or thermoplastics	Different metals or small electronic components	Can join dissimilar metals

Aspect	Welding	Soldering	Brazing
Strength	Strongest joint, comparable to or stronger than base material	Weakest joint, not for load-bearing applications	Stronger than soldering, but typically not as strong as welding
Process	Melting base metals and filler metal	Melting filler metal, base metals remain solid	Melting filler metal, base metals remain solid
Applications	Construction, automotive, aerospace, shipbuilding	Electronics, plumbing, jewelry	HVAC systems, aerospace, automotive, plumbing
Equipment	Welding machine, electrodes, protective gear	Soldering iron, solder wire, flux	Brazing torch, filler metal, flux
Advantages	Produces very strong joints, suitable for thick and thin materials	Low heat input, easier to perform	Can join dissimilar metals, produces strong, leak-proof joints
Disadvantages	High heat and energy required, risk of distortion	Produces weaker joints, not suitable for high-strength applications	Requires careful temperature control, joint strength less than welding
Example Filler Metals	Various welding rods and wires	Tin-lead, lead-free, silver alloys	Brass, silver, aluminum alloys

Timbering
Week 7-8

Experiment: Timbering

Aim:
To learn the process of timbering, which includes felling, converting, and sawing timber.

Procedure:

Felling:

Select a mature tree suitable for timber.
Use a chainsaw to cut the tree close to the ground. Ensure safety measures are in place.
Remove branches and foliage from the felled tree.
Converting:

Transport the felled tree to a sawmill.
Debark the tree using a debarking tool.
Cut the tree into logs of manageable length using a circular saw.

Sawing:

Plain Sawing:
Position the log on the sawmill bed.
Saw the log longitudinally to produce planks of desired thickness.

Quarter Sawing:
Cut the log into quarters.
Saw each quarter into planks radially to produce planks with a straight grain pattern.
Safety Precautions:

- Wear safety equipment
- (gloves, glasses, ear protection).
- Follow the instructor's guidelines for using machinery.

Wood furnishing operations
Week 9

Experiment: Wood Furnishing Operations

Aim:
To understand and perform various wood furnishing operations including planing, sanding, and finishing.

Procedure:

Planing:

- Secure a rough-cut plank on the workbench.
- Use a jack plane to remove major imperfections and level the surface.
- Follow up with a smoothing plane for a finer finish.

Sanding:

- Start with coarse sandpaper (e.g., 80 grit) to remove any remaining rough spots.
- Progressively use finer grits (120, 220) to smooth the wood surface.

Finishing:

Varnishing:
- Apply a coat of varnish using a brush.
- Allow it to dry, sand lightly with fine sandpaper (e.g., 320 grit), and apply additional coats as needed.

Oiling:

- Apply wood oil with a rag, rubbing it into the wood grain.
- Let it soak and dry, then buff the surface for a polished look.

Painting:

- Apply a primer coat if necessary.
- Paint the wood with a brush or spray gun, allow it to dry, and apply additional coats for desired coverage.

Safety Precautions:

- Work in a well-ventilated area when applying finishes.
- Wear protective gloves and masks.

Seasoning of timber
Week 10-11

Experiment: Seasoning of Timber

Aim:

To understand and perform the seasoning of timber, which reduces moisture content and improves wood properties.

Procedure:

Natural Seasoning:

- Stack the sawn timber in a dry, ventilated area.
- Place spacers between layers to allow air circulation.
- Monitor the moisture content periodically using a moisture meter.
- Natural seasoning can take several months to years depending on the wood type and environmental conditions.

Kiln Seasoning:

- Load the timber into a kiln.
- Set the kiln to the appropriate temperature and humidity settings.
- Dry the timber in the kiln, which accelerates the seasoning process to a few days or weeks.
- Use a moisture meter to check the timber's moisture content regularly.

Testing Moisture Content:

- Use a moisture meter to measure the initial moisture content of the timber.
- Weigh a sample piece of timber before and after drying to determine the loss of moisture.
- Aim for a moisture content of 8-12% for most indoor applications.

Safety Precautions:

- Follow all safety guidelines for using the kiln.
- Handle seasoned timber carefully to avoid splinters and injury.

Practice, Review/Reserved Day

Week 12-13

Lab Report Assessment, Self study

Week 14-15

Lab Test, Viva, Quiz, Overall Assessment, Skill Development Test (Competency)

Week 16-17