BDCTZ401- TERRAZZO WORKS

Terrazzo is a composite material that originated in Italy during the 15th century. It typically consists of chips of marble, quartz, granite, or glass mixed with a cement or epoxy binder. The word “terrazzo” comes from the Italian word for terrace, as the original technique was used to create durable and decorative flooring in outdoor spaces.

LEARNING OUTCOME 1: PERFORM PRELIMINARY WORKS

IC.1.1: Identification of PPE used for terrazzo works

➢ **Definition of PPE**

Personal Protective Equipment (PPE) is the name for clothes and other wearable items that forma line of defense against accidents or injury.
PPE is not the only way of preventing accidents or injury. It should be used with all the other methods of staying healthy and safe in the workplace (equipment, training, regulations and laws
Etc.)

➢ **Types of PPE AND THEIR USES**

✓ Helmet: For head protection
✓ Gloves: For hands protection
✓ Goggles: For eyes protection
✓ Dust mask: for face (nose &mouth) protection
✓ Overall: For body (skin) protection
✓ Safety shoes (boots): For feet protection
✓ Ear protector: For ears protection

➢ **Maintenance and Storing PPE**

It is important that PPE is well maintained. Maintenance may include:

- Cleaning
- Examination (to observe/inspect carefully /critically)
- Replacement
- Repair and testing

Where PPE is provided, adequate storage facilities for PPE must also be provided for when it is not in use, unless the employee can take PPE away from the workplace.

IC. 1.2: Select tools and equipment for terrazzo works

➢ **Classification of tools and equipment for terrazzo works**

✓ **setting out tools/equipment**

- Spirit level
- Builder"s Square
- Hammer
- Building line

- Tape measure
- -Hose pipe
- -chalk line

✓ **Cutting tools/machines**

- circular saw fitted with masonry blade

✓ **Mixing tools/equipment**

- Concrete mixer
- Bucket
- wheelbarrow
- Spade
- Steel rod mixer

✓ **Batching tools/equipment**

- Gauge box
- Spade
- Weighing scale…

✓ **Smoothing tools/equipment**

- Surface grinder machine equipped with the following grinder stone:
- Carborundum stones with coarse grade (No60)or Diamond disk (stone floor grinder)
- Carborundum stones with fine grade (No120)
- Carborundum stones with the coarse grade (No 320).

This is used for polishing

✓ **cleaning tools/equipment**

- Pressure washer
- Squeegee
- Heavy –duty floor roller

✓ **transporting equipment**

- Wheelbarrow
- Trucks
- Buckets…

Other tools

- Wooden float
- Straight edge
- Trowel

- Steel float…

IC. 1.3: Preparation of tools and equipment for terrazzo materials

All tools and Equipments to be used have to be well collect and checked (tested) if are in good conditions, and remember to select the required tools and equipments related to the task.

IC.1.4. Storage of terrazzo materials

➢ **Types of storage**
- Internal storage (on-site storage)
- External storage (Warehouses storage)

- **Internal Storage:** Materials are stored on-site in designated storage areas, such as silos or bins, protected from the elements and moisture.
- **External Storage:** Materials like aggregates may be stored externally on-site in stockpiles with proper drainage and cover to protect them from rain and contamination.

➢ **Requirements of good storage**

- It should be air ventilated
- It should be spaced enough
- Security
- Dimensional
- Provide security to the items (sock)
- It should contain the roof.
- well paved

IC. 1.5: Selection of terrazzo materials

➢ **Introduction to terrazzo**

Terrazzo is a manufactured composite of natural marble chips *(small particles obtained from rocks)*, with durable aggregates set in a cement matrix with added colour. It is poured in place or precast.

It consists of chips of **marble, quartz, granite, glass,** or other suitable material, pored with a **cementitious** (for chemical binding), **polymeric** (for physical binding), or a combination of both
The marble chips can be selected from a wide range of colours in practically any colour of cement matrix to create any type of effect.

The most extensive use of terrazzo is for floors, whether in situ or in tiles. Skirtings, partitions, staircases and other pre-cast units can also be made of terrazzo.
Terrazzo is mainly used internally. It can be found in supermarkets, railway stations, airports, hospitals, reception areas, bakeries, and public and private foyers (*foyers:corridors or waiting room)* and buildings.
Terrazzo pavement is almost impenetrable to moisture and very durable, but its construction involves a high input of energy.

- **Identification of terrazzo materials**

1. Matrix (Cementitious materials or matrices)
2. Marble chips (chips of various types (1.marbles, 2.granite,
3.quartz and4.glass)
3. White Portland cement
4. Colored pigments
5. Sand and gravels
6. Water
7. Timber planks
8. Wax polish
9. Divider strips
10. Nails
11. Admixtures

1. Marble

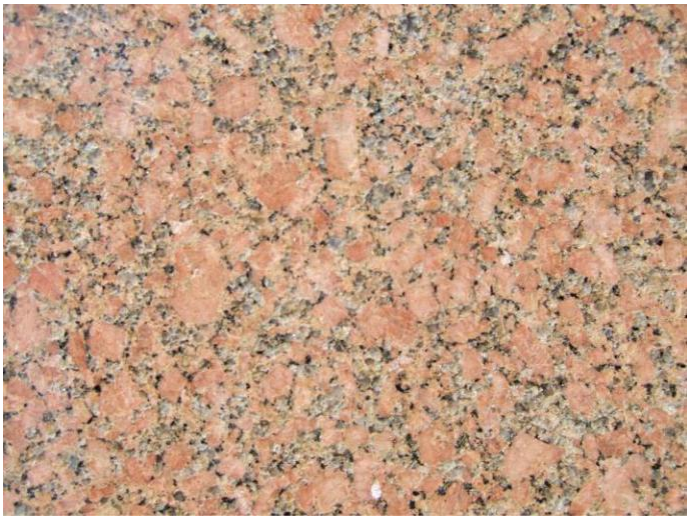
Marble is a metamorphic rock composed of recrystallized carbonate minerals, most commonly calcite or dolomite. Marble granules screened to various sizes are called marble chips selecting**.**
It is important that the size and color combinations be shown due to price differentials.

2. Quartz

Quartz is a mineral composed of silica and oxygen atoms in a continuous framework of SiO_4 silicon–oxygen tetrahedra

3. Granite

Granite is a visibly granular, igneous rock generally ranging in colour from pink to light or dark grey and consisting mostly of quartz and feldspars, accompanied by one or more dark minerals.
Granites can be predominantly white, pink, or gray in color, depending on their mineralogy.



4. Matrices

The matrix is the ingredient in a terrazzo floor which acts as a binder to hold the chips in position. There are three basic types of matrices: cementitious, modified-cementitious and resinous.

i. Cementitious matrices: Portland cement provides a good background for marble chips. It can be tinted to produce various colors.

ii. Modified-cementitious matrices: Polyacrylate Modified Cement: A composition resinous material which has proven to be an excellent binder for use in thin-set terrazzo.
iii. Resinous matrices: epoxy or polyester: A two component thermal setting resinous material which has proven to be an excellent binder for use in thin-set terrazzo. Epoxy resins come in two parts: the resin and the hardener. When the two parts are mixed together, a chemical reaction occurs that cause"s heat production. This heat changes the epoxy from a liquid to a solid.

5. Color pigments: When it is necessary for aesthetics reasons to use an artificially colored is necessary.

6. Divider strips: White alloy of zinc, brass and plastic are used for function and aesthetics.

7. Glass

Glass is a non-crystalline amorphous solid that is often transparent and has widespread practical, technological, and decorative usage

Note: MARBLE CHIPS SIZES: Marble chips are graded by number according to size in accordance with standards adopted

Figure: Terrazzo in situ

➢ History and Technology

The art of terrazzo flooring has its origins in Italy with Terrazzo being a municipality in the Province of Verona. The history of terrazzo flooring is long, with Italian craftsmen establishing themselves as leaders and artisans thousands of years ago.

This depth of history is evidenced with archaeologists using the term „terrazzo" to describe the floors of early Neolithic buildings between 9000-8000. BC Terrazzo was created by Venetian construction workers as a low cost flooring material, known for its longevity and hygiene qualities as a superior flooring material.

Many public hospitals still retain terrazzo floors in their operating theatres due to its durability and hygiene. Italian terrazzo workers respect the creativity of

the product and have a strong dedication to issues of quality; having mastered the art of the manufacturing and placing of terrazzo.

➢ **Factors for selecting terrazzo materials**

1. Initial cost
2. Appearance required
3. Cleanliness
4. Durability
5. Damp –resistance
6. Sound insulation
7. Thermal insulation
8. Smoothness
9. Hardness
10. Comfort
11. Fire resistance
12. Maintenance factor
13. Light reflection
14. Floor design

IC.1.6: Preparation of working area

- During this stage, installers will observe the following points: Signs of possible defects already existing within the floor"s surface.
- Any cracks visible in the sub-base floor; If cracks are present, an installer must repair the cracks with a fresh concrete.
- The leveling of the surface.

If floors are uneven, an installer can apply properly a fresh concrete over cleaned old concrete surface and use a straight edge to level the surface.

To provide a proper bond between sub-floor and or concrete base and terrazzo flooring,
The concrete floor must be:

- Free from dust,
- Free from impurities and
- Not troweled to a smooth finish: It is optimum to sweep the concrete surface with a broom just before it sets to give a key to the terrazzo.

If a floor has any floor finish on it, you will need to remove it completely by the means of chisel and a “Diamond abrasive cut

➢ **Assessment of working area:**

This process consists of determining the size of the room or area.

Using tape measure, measure the room from one side wall to the opposite wall, and note distance. This helps in decision of the shape of panels and their sizes.

- **cleaning of the working area**
- **watering the surface area**

Much of the preliminary work of terrazzo workers is similar to that of cement masons.

Marble-chip, cementations terrazzo requires three layers of materials:

1. Cement masons or terrazzo workers build a solid, level concrete foundation that is 8 to 10 cm deep.

2. After the forms are removed from the foundation, workers add a 3 cm layer of sandy concrete.
Before this layer sets, terrazzo workers partially embed metal divider strips in the concrete wherever there is to be a joint or change of color in the terrazzo.

3. For the final layer, terrazzo workers blend and place into each of the panels a fine marble chip mixture that may be color-pigmented. While the mixture is still wet, workers toss additional marble chips of various colors into each panel and roll a weighted roller over the entire surface.

Advantages and disadvantages of terrazzo pavement

a) Advantages

Terrazzo is:

i. A high quality product
ii. Durable product
iii. Almost impenetrable to moisture
iv. Easy to keep clean and maintain
v. Extremely hard wearing
vi. Attractive in appearance
vii. You can choose any design because terrazzo is manufactured by mixing different elements. This allows the architects to include abstract decorative designs, seals, logos and other design during the terrazzo installation.
viii. Environmentally-Friendly: the material can consist of recycled materials which have a positive impact on the health of people and the environment. The epoxy used in the terrazzo mix has low volatile organic compounds content, which diminishes harmful gasses from dispersing into the air.
ix. Flexible; it can be designed by keeping with other architectural buildings and colour schemes.
x. Hygienic; suitable for some areas of food preparation

xi. Manufactured to a stringent quality and safety standards
xii. Cost effective – it will outlive most other types of hard flooring.

b) Disadvantages

i. High initial cost
ii. Cold nature: the surface does not retain heat well during winter months, making the floor feeling a tad cold.
iii. Complex during installation.
iv. Needs high input of energy

1. Preparation of casting area

Preparation of casting area is to set out and arrangement of the space where the casting process will take place.

Set out the casting area for project, follow these steps:

1. Site preparation
2. Marking the area
3. Chalk lines or measuring tools
4. Considerations for terrazzo
5. Expansion joints
6. Formwork installation
7. Double check measurements
8. Ready for casting