IE223L Workstudy and Methods Engineering

Student Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Program: BS Industrial Engineering

## Lab 09: To draw the improved layout of workshop lab through string diagram.

## Apparatus:

1. Pins
2. String
3. Measuring tape

## Theory:

## String Diagram

We make use of flow diagram for recording the movement of men or material when the movement is simple and the path is almost fixed. But when the paths are many and are repetitive it may not be possible to record them in a flow diagram. Here a string diagram is used String diagram is a scaled plan of the shop. Location of machines and various facilities are drawn to scale in a drawing sheet Pins are fixed at the various work centers in the drawing sheet. A continuous colored thread or string is taken round the pins where the material or worker moves during the process. The string diagram is a scale plan or model on which a thread is used to trace and measure the month of workers, material or equipment during a specified sequence of events The string diagram is a special form of flow diagram, in which a string or thread is used to measure distance. It is necessary that the string diagram be drawn correctly to scale. The string diagram is started in exactly the same way as all other method studies by recording all the relevant facts from direct observation A string diagram can be used to plot the movements of materials, and, especially when a work study person wants to find out easily just how far the materials travel.

## EXAMINE critically

* A study of the diagram shows at once that the most frequent movement is the 10 x 10 and 15x 15 rows of bins. Tiles are constantly being withdrawn for glazing

## DEVELOP the new layout

The first step in developing the new layout is to locate the bins containing the most handled tiles as near as possible to the inspection bench and those containing special feature" tiles as far away as possible. The distances covered were reduced from 520 to 340 meters, a saving of 35 per cent String diagrams are particularly useful to study the movement of workers in circumstances like one man attending several machines, processes involving involvement of the worker from one place to another, etc.

## String Diagram:

The string diagram is a scale plan or model on which at bread is used to trace and measure the path of worker materials of equipment during a specified sequence of events When there is too much of movement involved then, a flow diagram may become incomprehensible In such cases, string diagram is used The scale layout is fixed to a board and plans, are driven into the board to mark the location of various activities and also at points where the direction wound round the pins following the various activities in sequence. The distance covered can be calculated by measuring the length of the thread used. These diagrams are particularly useful when, considering problems of plant layout' and design Proposed improvements can be effectively demonstrated bold, to management and workers Features like back-tracking, excessive movement and congestion are clearly shown hips to take steps to improve the situation. String Diagram is a scale layout drawing on which, length of a string is used to record the extent as well as the pattern of movement of a worker working within a limited area during a certain period of time. It is a scale diagram on which color threads are wrapped around pins or pegs which are used to indicate the paths taken by either worker or material or equipment when processing is done on material from start to finish String diagram is thus a special form of flow diagram in which a string or thread is used to measure distance because of this it is necessary that the string diagram be drawn correctly to scale whereas the ordinary flow diagram will probably be drawn only approximately to scale with pertinent scale marked on it so that scaling off is necessary Thus, it is a special form of flow diagram in which a string or thread is used for measuring the distance traveled The string diagram is started exactly in the same way as all other method studies: by recording all the relevant facts from direct observation This may be achieved by using a simple movement study sheet" The observation and hence the recording continues until the work study man becomes sure they obtained facts give the true picture of the Sam

## When to use it

* Use it when analyzing a manual or physical process that involves significant physical movement, in order to make movements easier and quicker Movements may be of people, materials or machines
* Use it when designing the layout of a work area, to identify the optimum positioning of machines and furniture

## How to understand it

The placement of equipment and furniture in work areas is often done randomly and sequentially, rather than with any sense of what positioning will make the work cashier. The result is that subsequent work requires much more moving about than is necessary. A part of the

problem is that when designing a work area, it can be difficult to see what movement will be necessary The String Diagram is a simple tool for analyzing and designing work spaces such that movement can be minimized, the basic diagram simply consists of a map of the work area, with the actual movements drawn on top, thus It is common to also indicate type of actions being done at each point. This is typically done in the same symbol set that is used in the Flow Process Chart. When analyzing the diagram, both the positioning of equipment and the sequencing and detail of actions may be considered. A simple revision of the process may enable the distance moved to be significantly reduced (this may well be preferable to moving heavy equipment around)

## Example

A metal worker became fed up with walking what seemed to be half-way around the machine room to build a metal box. With help from the works facilitator, he measured the distance be traveled to build one box, using a pinboard and scale map of his workshop area, as below.

## Other examples

A self-service restaurant team measures the route taken by customers around the food counters and also identifies the most popular meals that they are building They rearrange the counters and food to enable a logical progression for the most common meals. They also include complementary and high-margin food in this line, which helps to increase the profitability of the restaurant A traffic planning department uses a helicopter to spot the routes taken by a sample of vehicles passing through the town, plotting the lines on a street map Common destination and routes are now easily identified (along with short-cuts taken through residential areas as a result, some roads are widened, others are blocked and signs erected. The results much smoother traffic flow maintenance team measures the route taken by engineers making routine checks on key oment throughout the plant, plotting it on a site plan. They are then able to plot much shorter route to each of the same machines.

## Objective:

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**Procedure:**

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## Comments: