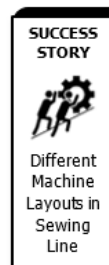


Different Machine Layouts in Sewing Line

Line planning has always been a major determinant of the productivity of workers. Whether product-based or process-based, sewing machine lines layouts are regularly improvised to gain maximum efficiency. Various machine layouts are available that can be deployed on a sewing floor.



by Prabir Jana 01-May-2009

We aim different arrangements of machines in sewing lines towards optimal floor area utilization, better control, easier supervision, controlled installation and running costs, besides better housekeeping and conformance to compliance. There is no right or wrong layout; the aim is to maximize the use of floor area and easy maneuvering of machines to achieve efficiency in production.



A unidirectional layout 'A'

Prabir Jana and Y.P. Garg, in this article, analyze the advantages and disadvantages of different layouts by giving several machine layouts plans to enable organizations to select the option best suited to their needs.

Plant layout or factory layout is an area under constant scrutiny by factory managers. Plant layout comprises cutting room layout, sewing room layout, and finishing room layout. Although all departments are equally important, the sewing room layout gets maximum attention. Two rows of sewing machine and center table in-between is a common view in almost all factories. The origin of the center table is not known, but it is probably meant to solve two problems together: to provide a cover to electrical wiring and also to act as a material storage/transfer facility.

However, sewing machines without a center table are also common in these days and sewing machines with overhead material hanging system are increasingly becoming popular. During

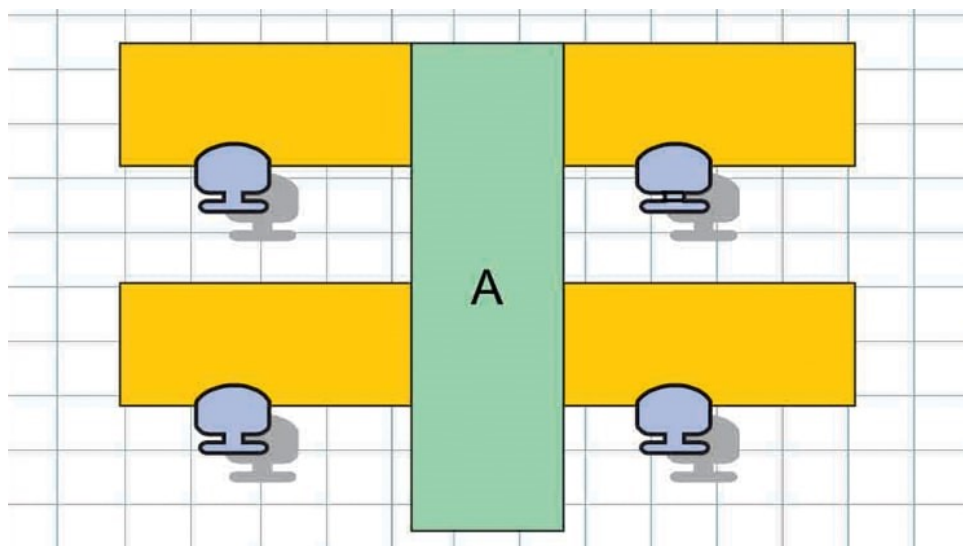
the mid-80's, there were some factories with conveyors (in place of the center table) in-between two rows of machines, but today motorized conveyors are no longer in existence.



Workers facing both directions in an instance of layout 'B'

In fact, the arrangement of a sewing machine depends on whether the layout is product-based or process-based. Few knitwear manufacturing companies follow process-based layouts, while most follow product-based layouts. In a process-based layout, similar types of machines are grouped together, where similar operations are carried out before passing on to the next group of operators. In a product-based layout, we arranged machines based on a sequence of operations derived out of operation breakdown and process flow chart.

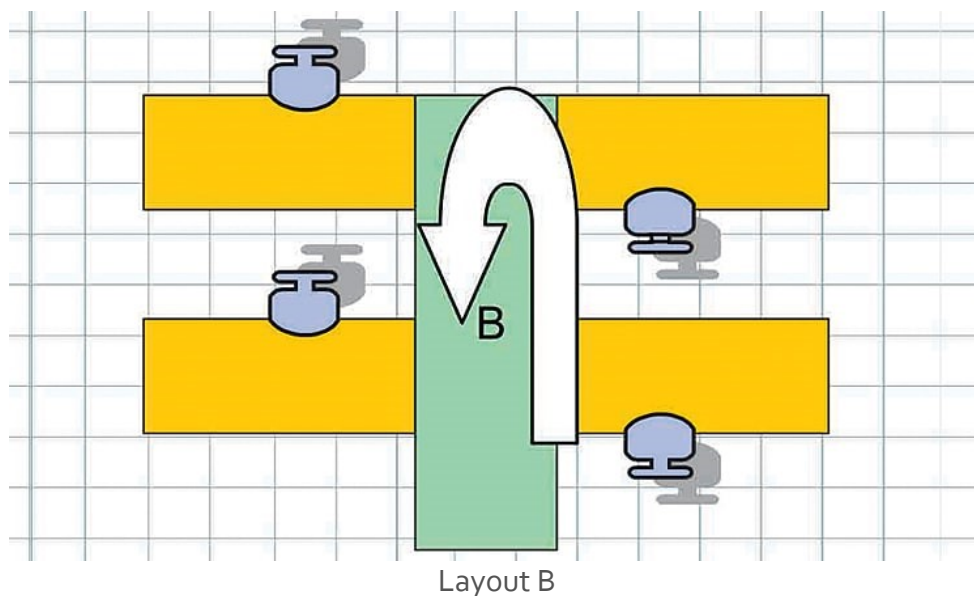
In the product-based layout, whether sewing is done in PBU (Progressive Bundle Unit) system or UPS (Unit Production System), we arranged machines in a straight line. In PBU system, we arrange two columns of sewing machines either with a center table in-between or pickup and disposal bins/trolleys by the side. Both forms of PBU layout are quite common and widely used with improvisation wherever required.



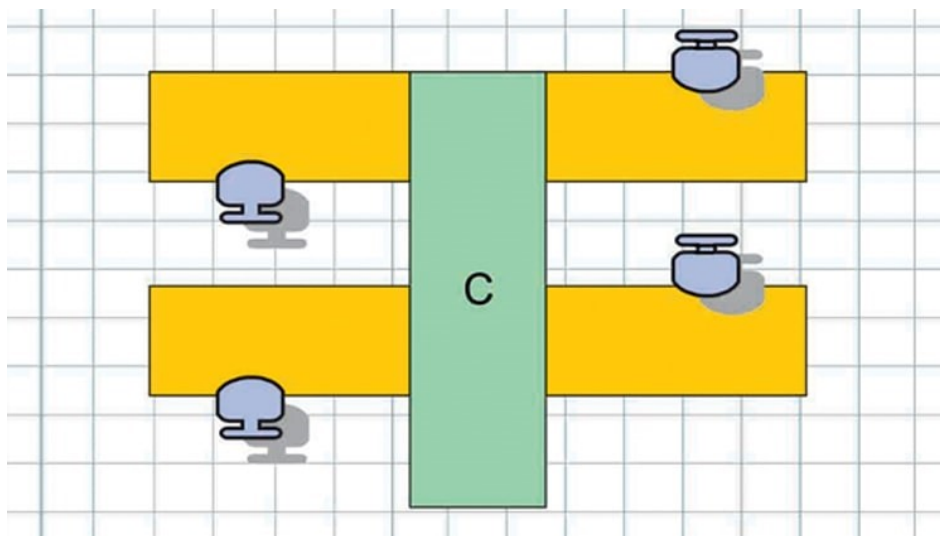
Layout A

Layout 'A' is the most common method of arranging machines with the centre table option; here, all operators are facing in one direction. For one column of workers, the centre table is on left, while for the other column of operators the centre table is on right, hence differential ease of bundle pickup and disposal. Centre table on the left side of the operator is always better for larger component. For operations involving a two component assembly where picking has to be done from both right and left of the operators, the service table at right is advisable, this is because additional extension space can be created at left side with comparative ease but creating additional space at right side of machine is difficult.

Generally wiring is done underneath the centre table, and the sewing machine motor is on the right side of the sewing machine table, so wiring for one column of the sewing machine is cumbersome. Material movement in this type of layout is lateral/vertical/zigzag. Light source has to be separate for two columns of machine, thus infrastructure cost for lighting will be more. As operators are facing same sides (regimental seating) they are less prone to talk. The arrangement is 'vaastu-friendly'.

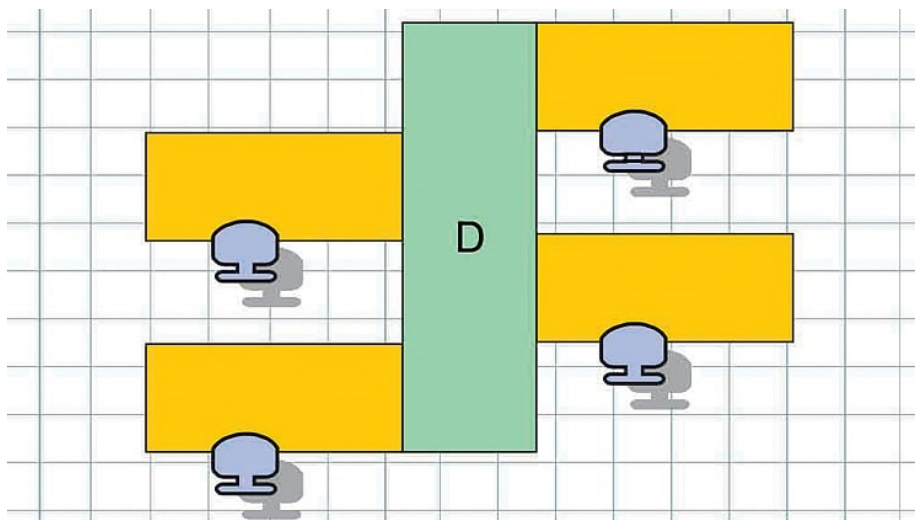


Layout 'B' is another common method of arranging machines. Here center table is on the left side of both set of operators, hence easier to pick up and dispose of bundles. Because of the closeness of the motor towards the center table, electrical wiring is easier. Here, material movement is in 'U'-shape or 'return feed' type. One column of operators moves the material up the line and the second column of operators moves the material down the line. The cut component loading point and finished garment unloading point remain at the same point. As the needle points of two columns of operators are close to each other, a light source can be common, thus cost of lighting infrastructure is lesser. As the operators are sitting face to face in adjacent columns, they are likely to indulge in talking and the layout remains non-friendly to 'vaastu'.



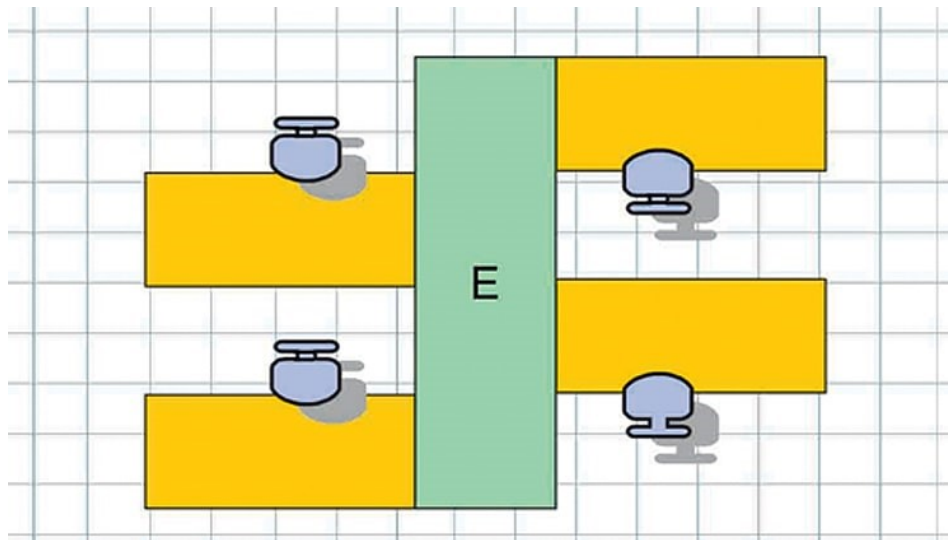
Layout C

Layout 'C' is the wrong re-arrangement of layout 'B', where the center table for both columns of operators is on the right side. We should avoid this type of layout.



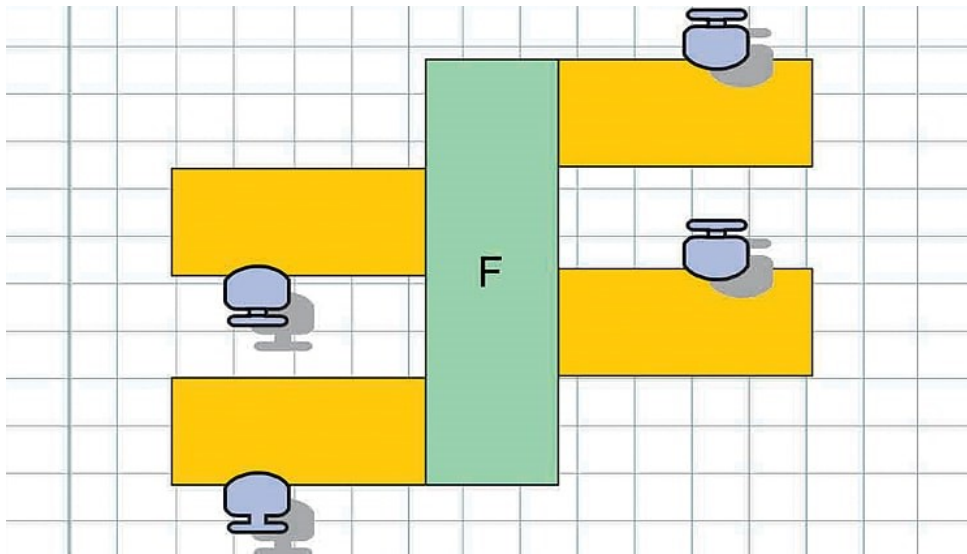
Layout D

Layout 'D' is like layout 'A'. However, the operator position (compared to layout 'A') is made alternate for easier pickup and disposal of bundles. Pickup and disposal space for each operator is staggered and separate, thus less claustrophobic. Space consumption at start and end of line is more than other options, hence poor in space utilization.



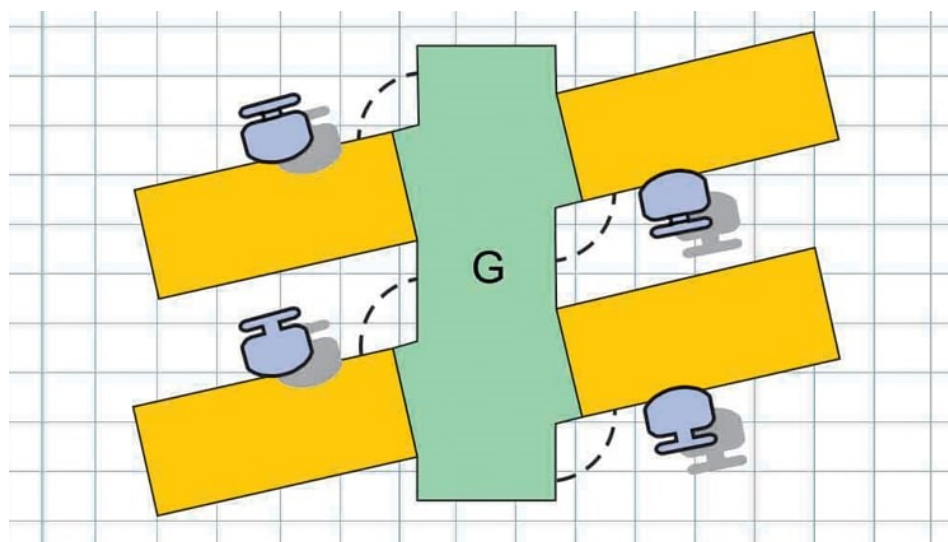
Layout E

Layout 'E' is a better arrangement of Layout 'D' and has a 'U' type of material movement like 'B'. All the characteristics of 'B' type layout apply to the additional advantage of having less claustrophobic material arrangement.



Layout F

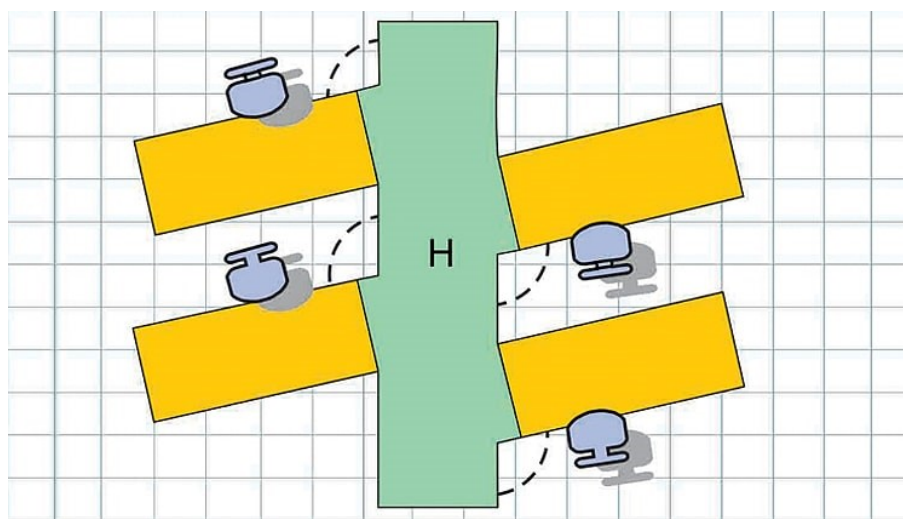
In Layout 'F', the center table is towards the right side of operators, resulting in inconvenient bundle pickup and disposal. This is a wrong arrangement of 'E' type and should be avoided at any cost.



Layout G

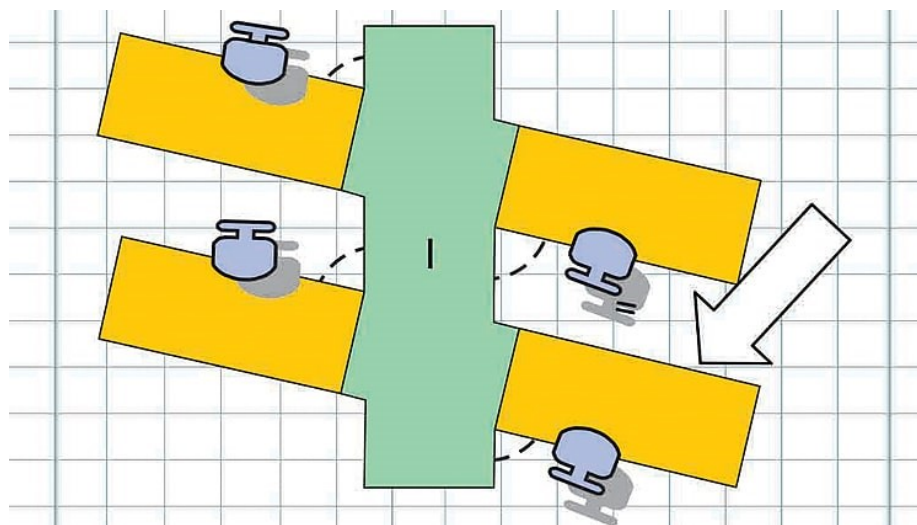
In Layout 'G', sewing machines are kept not in right angle to center table but at an obtuse angle towards operator. Disposal point of the preceding operator should always be the pickup point of the succeeding operator. In this type of layout, the disposal point of the operator sitting behind is conveniently on the left side of the operator sitting at the front. As the machines are arranged at an angle, the machine table gets an additional triangular space at left, which is always beneficial for large part sewing. We can make provision for the gravity chute at left of the operator. Normally, an angle of 105° to 120° is commonly maintained. However, more the angle, more is the space availability at left of operators. This non-regimental seating arrangement allows a lot of intangible benefits like non-monotonous, less tiring, less obstructive view, etc. Access to sewing machine by operators is comparatively better as more free space is available at the back of stool.

This angular layout is not commonly used in the industry because of various problems like difficulty in arranging machines at the specified angle, and making a triangular extension in center table, besides also being a carpenter's nightmare and having extremely high consumption of material and labor. A better option is to make a triangular extension in sewing table keeping the center table straight and rectangular. If implemented, this can cause additional benefit over 'B' type.



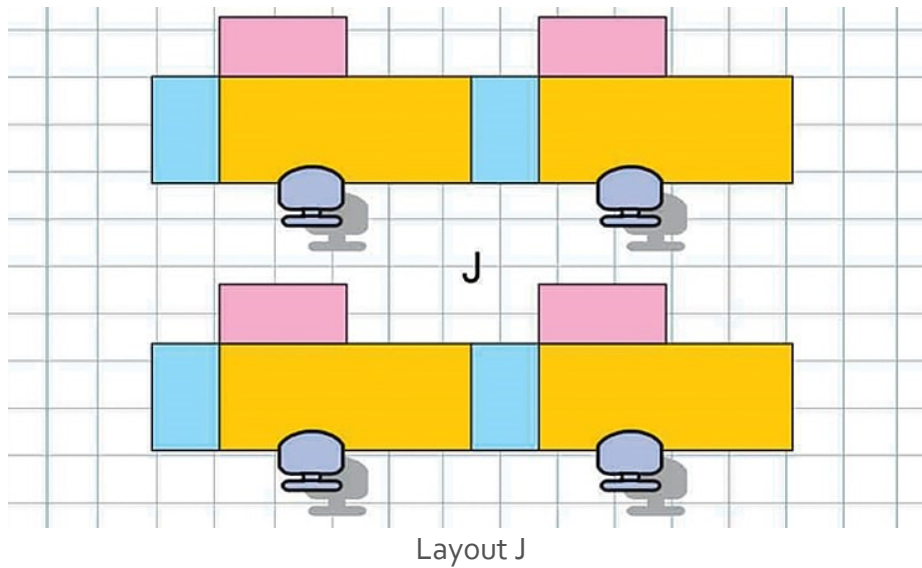
Layout H

Layout 'H' is a changed type of Layout 'G' where machines are placed alternatively to make the material area staggered and less claustrophobic. All other characteristics of Layout 'G' are achievable here.

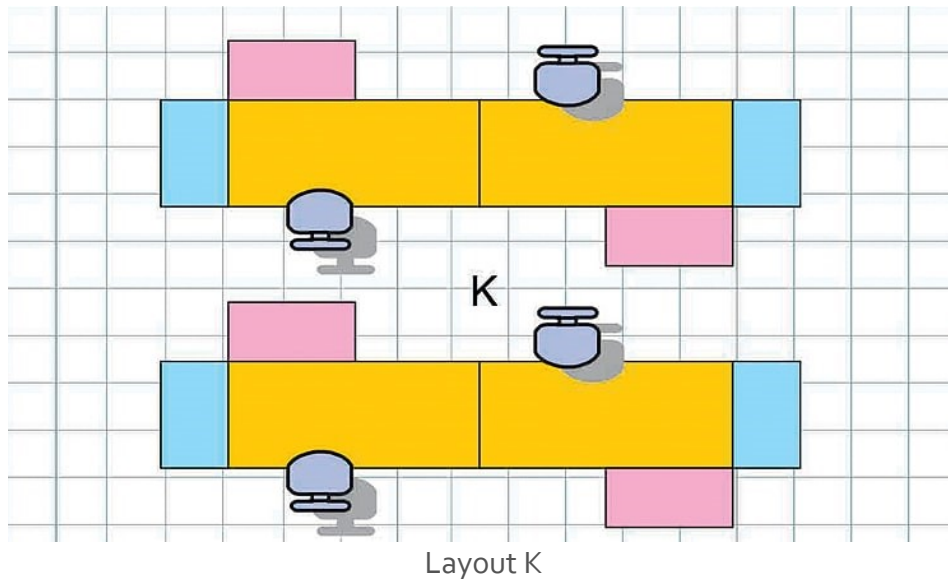


Layout I

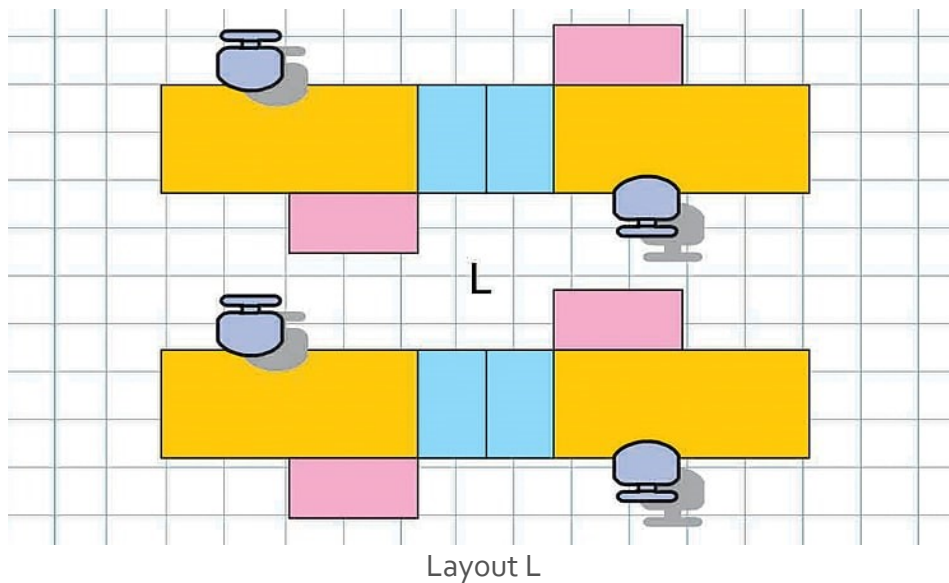
In Layout 'I', the machine angle on operator's side is acute (instead of obtuse) and does not result in much benefit. Here output of preceding operator lands directly at the back or on the right of the succeeding operator, thus resulting in no benefit of picking. In this angular set up the line supervisor has better physical access to operators for explanation and instructions.



Apart from center table options, sewing machines are also arranged with bins and trolleys. There is no standard layout for the variable size of bins and trolleys. Bins and trolleys are made of metal, plastic, wire mesh; fabric covered and can be fixed and/or detachable. For fixed bin or trolley size, one common option is Layout 'J'. The bin at the left of the operator is for pickup and the bin at rear of the sewing machine is for disposal of. Here the pieces are not manually emptied rather bins are moved between operations. A disposal bin of preceding operation will work as a pickup bin of succeeding operations. The bins or trolleys can simply be swapped.



Three close variations of bin or trolley layout are type 'J', 'K' or type 'L'. While 'K' offers ease in electrical wiring (as motors of both machines are at proximity), type 'J' offers no tangible benefit (except being vastu-friendly as operators are facing uni-direction). Type 'L' is tantamount to center table situation as pick up bins for both operators are together at center of the machine line.



Conclusion

All these different layout options are to be judiciously used based on area available, access points, light source, air flow, etc. Floor space utilization and aesthetic and sustainable arrangement of sewing machine is of paramount importance for achieving efficiency in production. Some of the common disadvantages of center table layout are:

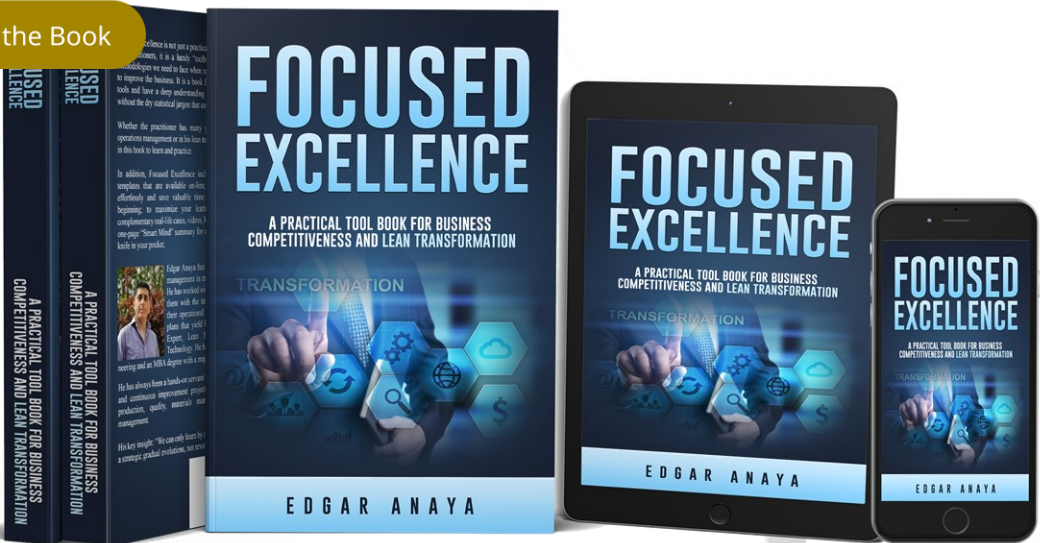
- Rigid and non-flexible.
- Arrangement of machines is difficult where over one operation is feeding one operation or vice versa. Resulting cross flow of WIP.
- Variable table size is difficult to accommodate.
- Separate pick-place-align-sew-dispose sequence cannot be accommodated.
- Vertical space is less used.

Source:

<https://apparelresources.com/business-news/manufacturing/basics-of-machine-layout-in-sewing-line/>



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