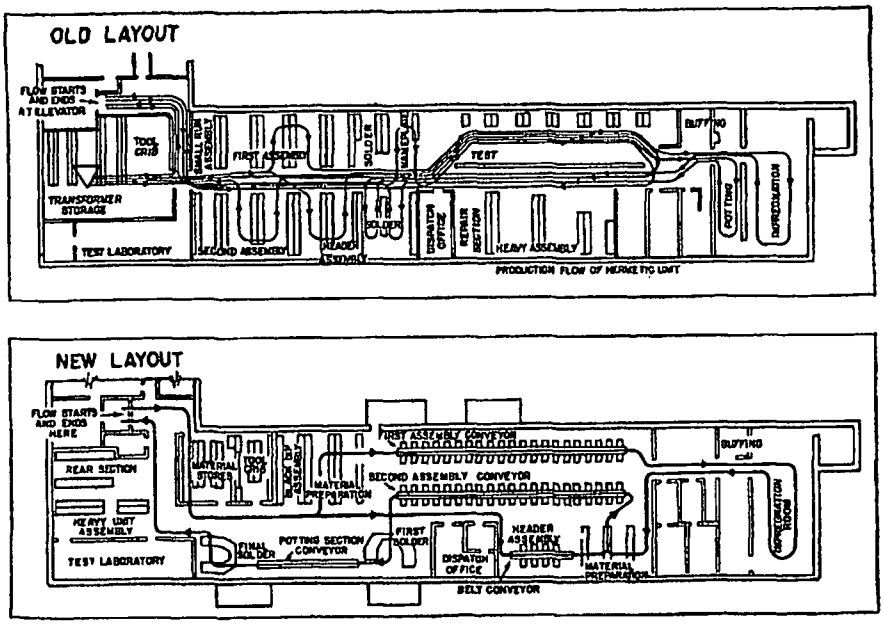


**Fig. 14-3. The new layout greatly reduced the hazards incidental to materials handling in this transformer manufacturing operation.**

pheated processes The nature of the materials and processes in each manufacturing stage can be studied and provision made to eliminate or control hazards

A simple flow sheet is shown in Fig 14-2. In this operation, a solvent and nitrocellulose are used in a lacquer manufacturing department, thus making special safety and fire prevention measures essential Plans include wall ventilating fans capable of producing an air change every 3 to 4 minutes Since solvent vapors are heavier than air, inlet and pickup ducts are located at floor level.

An automatic sprinkler system is considered primary protection for hazardous installations However, fire prevention measures in this flow sheet consist of a $CO_2$ total flooding automatic system, a steel and concrete structure, a ¾-in coating of sprayed asbestos, and first-aid fire equipment.

Safety features include spark-resistant conductive floor surfaces and grounding of equipment and structures Electrical motors, lighting, and apparatus are Class 1, Group D explosion-proof. Emergency exit doors are provided, and all tools, trucks, and similar equipment are made from spark-resistant metal

## Layout of equipment

Various methods are used to determine the safest and most efficient layout of production machines and equipment. The two-dimensional method consists of templates made to scale and fitted into a plan of the site or floor area

The most effective method is to use three-dimensional models, made to scale and set up on a scaled floor plan. The models can be rearranged until the safest and most efficient layout has been devised

Results to be obtained through layout studies are shown in Fig 14-3 Here the new layout reduced unit travel from 2,532 ft to 807 ft, of which 208 ft were conveyorized The saving in distance amounted to about 76 per cent This reduction is particularly significant to the safety engineer,