

What workers in export factories produce

The workers in each industry make many different products using different materials, machines, and tools. Some products, like shirts and shoes, are familiar to everyone. Other products, like valves and sensors, may be familiar only to people who have worked in electronics or auto parts factories. The pictures and summaries on these pages show some of the products of each industry and the materials they are made from.

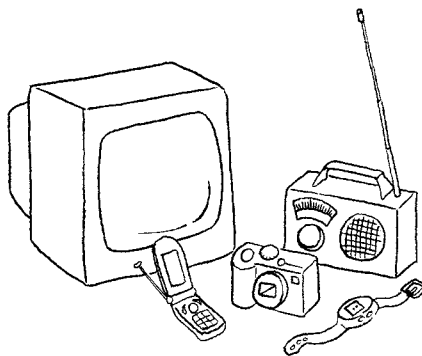
Garment workers make all kinds of clothes, such as pants, shirts, dresses, underwear, sleepwear, hats, jackets, coats, gloves, and uniforms.

Garments are made with natural or *synthetic* fabrics or leather, natural or synthetic dyes, and chemical treatments.



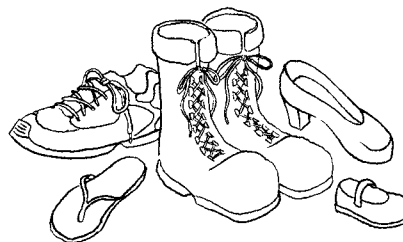
Electronics workers make computers, printers, monitors, modems, cables, scanners, drives (floppy, zip, DVD, CD, hard, tape), telephones, radios, televisions, disc and tape players, remote control devices, digital watches, cameras, recorders, medical equipment, sensors, monitoring devices, switches, lights, pacemakers, hearing aids, and other devices.

Electronic equipment is made with printed circuit boards and components, many types of metal, plastic, chemicals, and other materials.

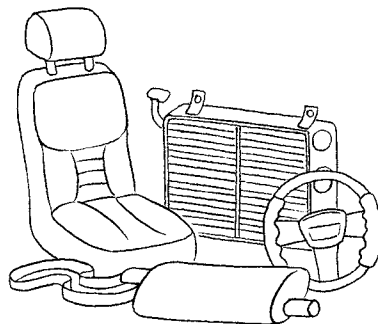


Shoe workers make all kinds of shoes, sandals, slippers, and boots for men, women, and children.

Shoes are made from leather, rubber, metal, foam, plastic, glue, and natural or synthetic fabrics, natural or synthetic dyes, and chemical treatments.



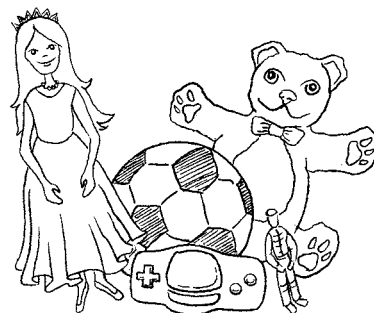
Auto parts workers make all kinds of parts for assembling or repairing cars and trucks, such as handles, pipes, hoses, panels, housings, upholstered and stuffed seats, panels, and steering wheels. They also assemble components such as sensors, valves, meters, switches, batteries, brakes, windshield wipers, wiring harnesses, steering columns, transmissions, and other engine and drive train parts.



Auto parts are made with metal, leather, glass, natural and synthetic fabric, resins, plastic, and chemicals.

Toy workers make all kinds of toys, such as board games, stuffed toys, dolls and figurines, building blocks, balls, electronic toys, and many others.

Toys are made with natural or synthetic fabric, metal, plastic, stone, wood, and paper. These materials are often combined in one toy, but most toys are made from plastic.



Where to look for dangers at work

To find work dangers in your factory, you can look at the jobs workers do in each step of the manufacturing process. These steps are almost the same in both large and small factories. First, workers unload materials into a warehouse or storage room. Other workers then prepare the raw materials and assemble the product. Different workers test, clean, inspect, package, and ship the products to buyers. Workers also deliver supplies to work areas in the factory and remove waste. For the process to run smoothly, workers must also keep the work place and equipment clean and in good repair.

On the following pages, we give examples of the jobs and dangers common to each step of the manufacturing process in both large and small factories.

After reading this chapter, it may be helpful to draw a map of your factory. You can track the flow of materials into, around, and out of the factory. You can then make a **hazard map** that shows the dangers in the factory by work area. For information about making a hazard map, see page xx.

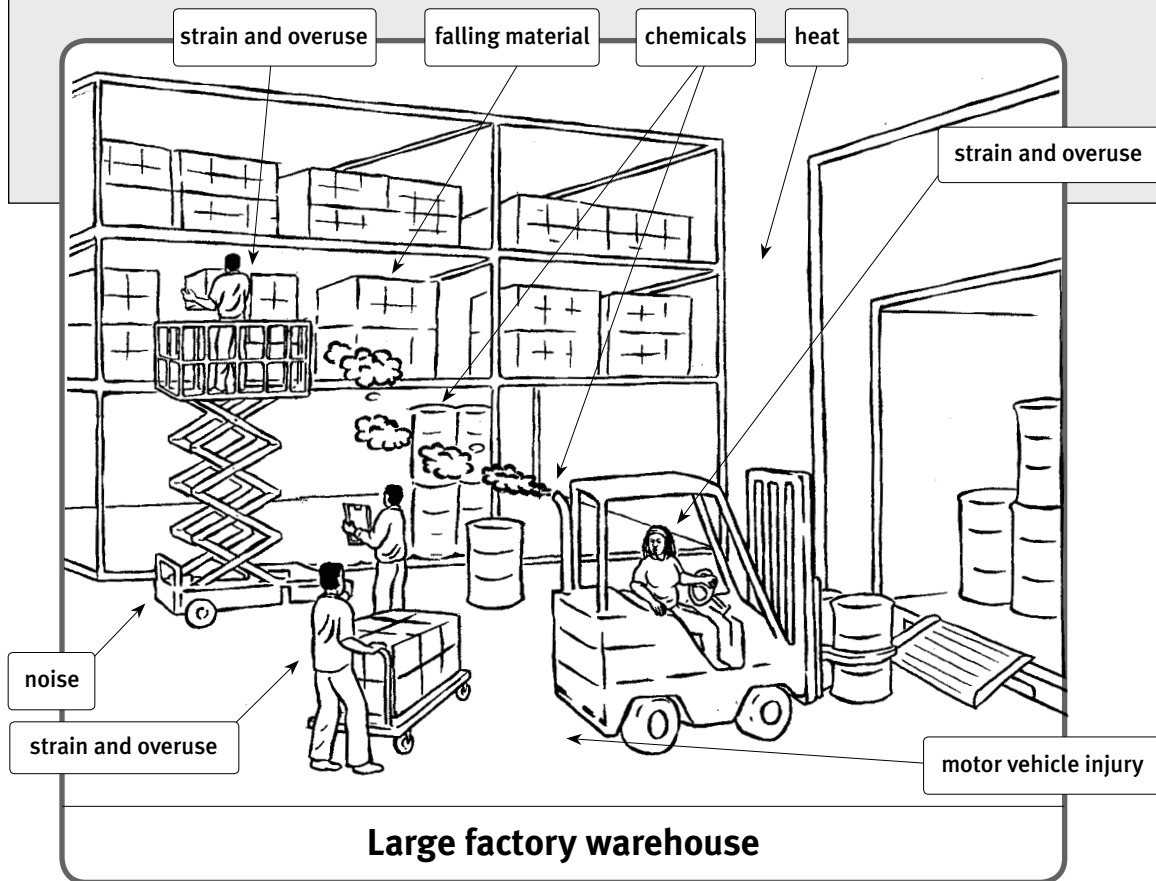
Warehouse and material handling

Supplies and raw materials are delivered to a warehouse where workers:

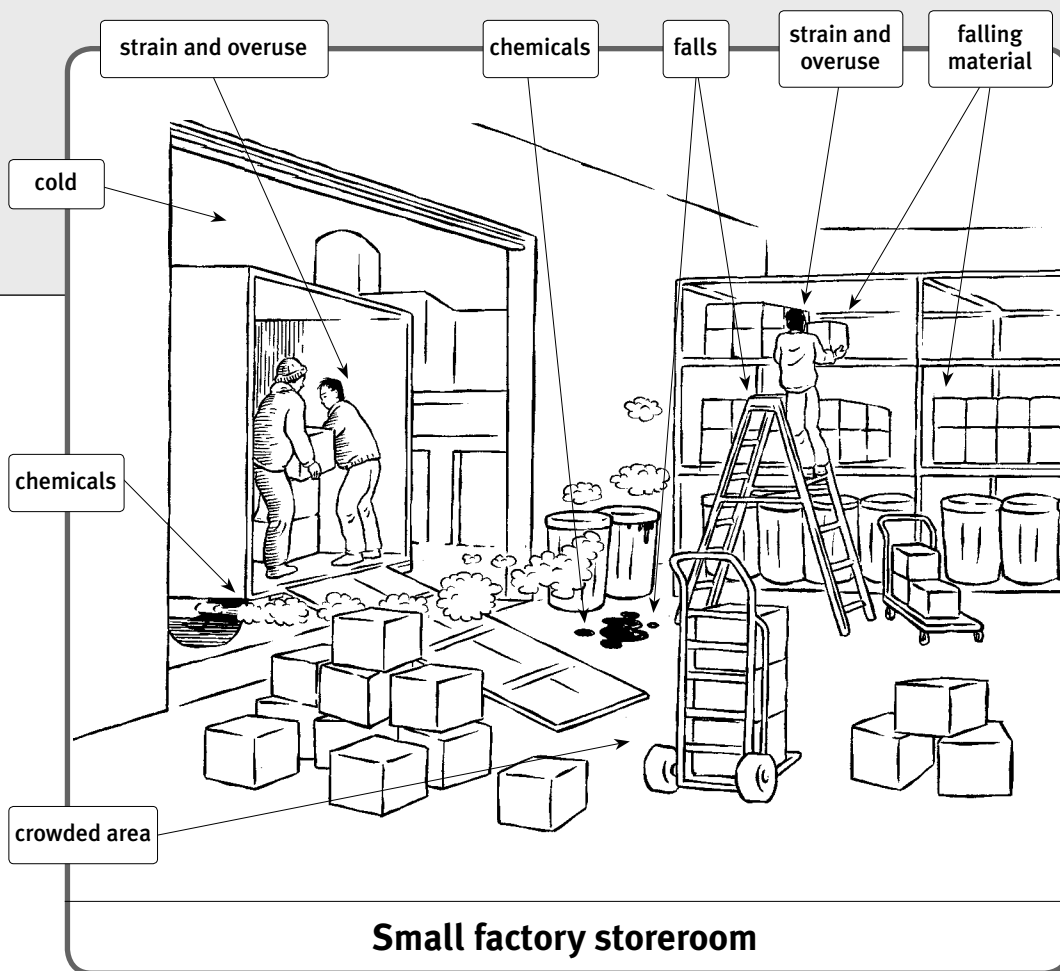
- receive and store boxes, bags, rolls, bottles, and barrels of materials.
- divide and repackage stored materials.
- deliver materials to work areas in the factory.
- prepare and store finished goods before they are shipped out .
- store and dispose of waste materials from the factory.

Dangers include:

- **strain and overuse** from lifting and carrying supplies on and off trucks or rail cars, moving materials on and off storage shelves, and carrying materials to the factory floor.
- **chemicals** from leaks or spills, in materials such as fabric or metal, and in motor exhaust from trucks, fork lifts, and other vehicles.



- **noise** from motors.
- **heat or cold** from sun and poor ventilation in a hot climate, or no insulation, warm clothes, or heating in a cold climate.
- **crowded work areas** that limit a worker's ability to see and move materials safely without hitting other people or objects.
- **motor vehicle injury** from being struck by fork lifts, carts, trucks, or rail cars. This can happen inside the warehouse or factory, at the loading dock, or between the warehouse and factory.
- **falls** from ladders or raised platforms while reaching high shelves or stacks, tripping over equipment or debris, or slipping on wet or sticky floors..
- **materials falling** onto workers from above.



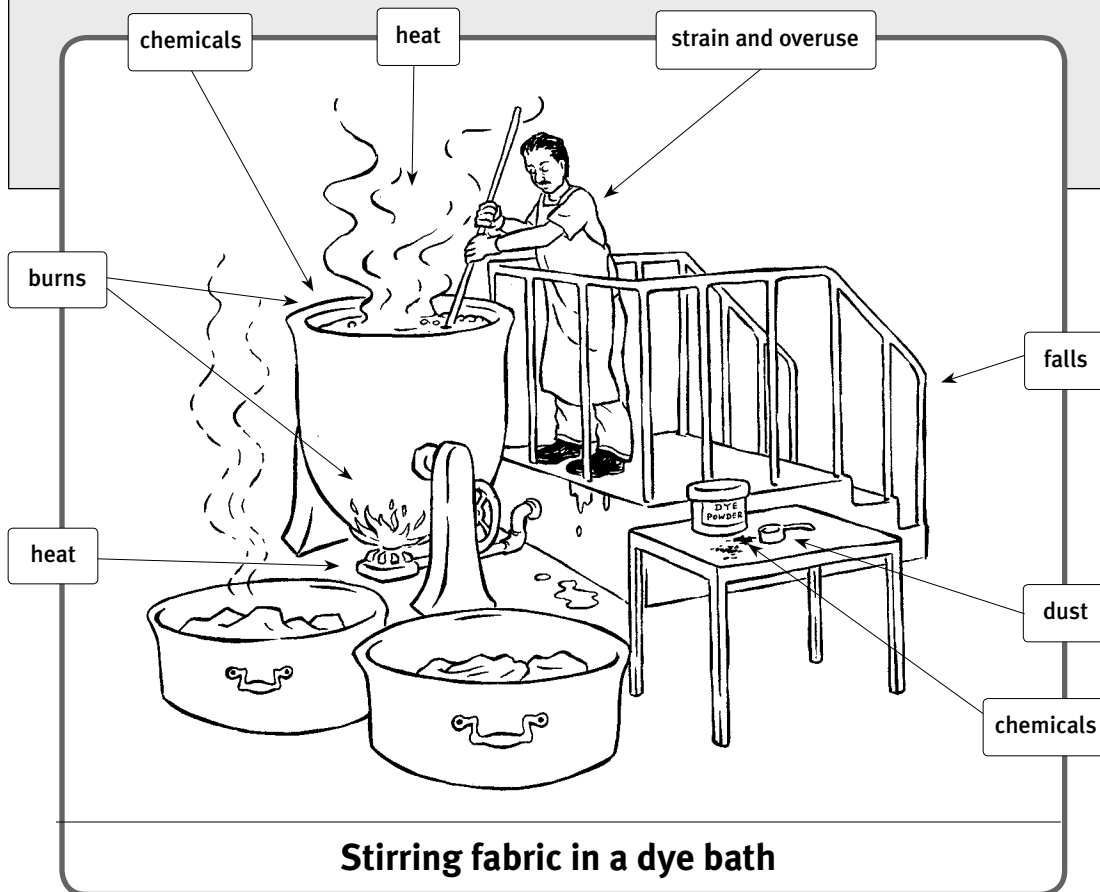
Making the product

Preparing materials and assembling a product is done in several steps. Each step can be dangerous to workers in several ways.

PREPARING RAW MATERIALS

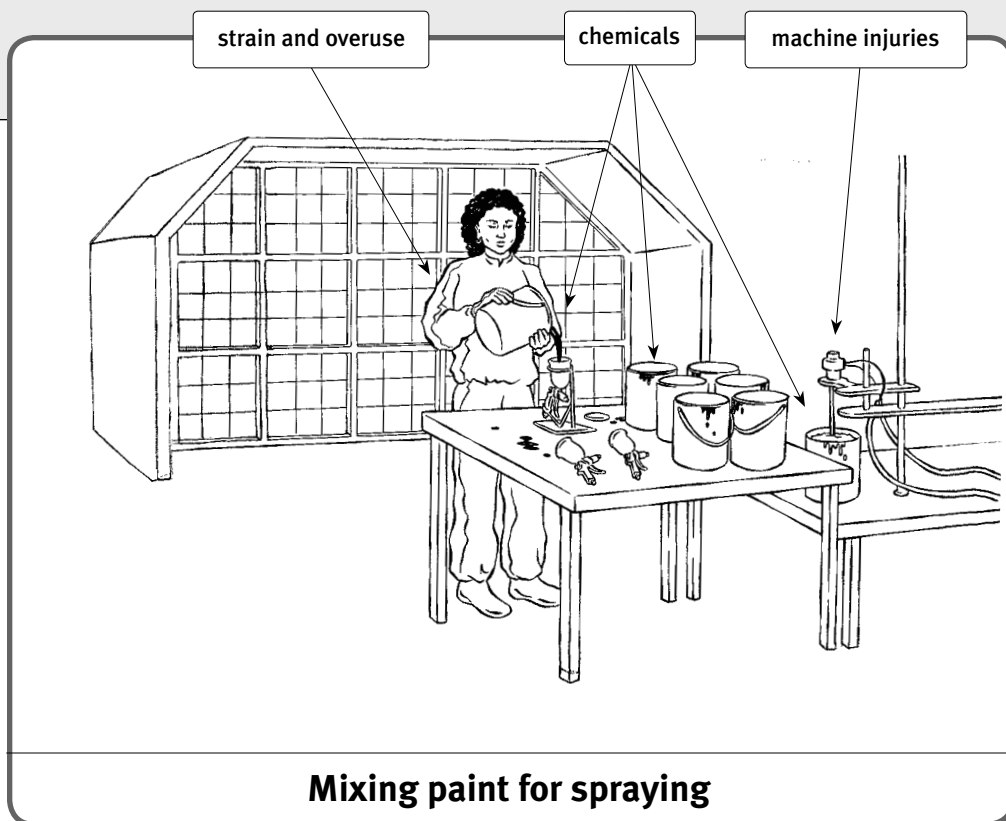
For some products, workers must:

- **clean surface of material** by machine or using chemicals to remove dirt, grease, rust, or scale.
- **mix raw materials to make plastic, dye, paint, or coating materials.** The raw materials are usually chemicals in powder, solid, or liquid form. They may be mixed in small or large batches by hand or by machine.
- **dye or treat fabric** or other materials with chemicals, by hand or using machines.
- **add a pattern or texture to fabric.** This is usually done using a machine.



Dangers include:

- **strain and overuse** from lifting and carrying materials.
- **chemicals** in the raw materials, or created during mixing or using dyes, plastic and foam. This danger includes fumes from heated plastics, dyes, and additives.
- **dust** from opening containers, handling fabric and other materials. Dust is also created by machinery.
- **machine injuries** from sharp or moving machine parts that can cut, crush, or amputate a hand, an arm, or other part of the body. Injuries can also be caused by a liquid or debris sprayed from a machine.
- **burns** from hot machinery and materials, such as melted plastic, molten metal, and dye baths.
- **heat** from working around hot machines and materials; such as molten metal, plastic, or chemical baths; especially in a hot room with poor ventilation.
- **falls** from stairs or a raised platform, tripping over equipment or debris, or slipping on wet or sticky floors.



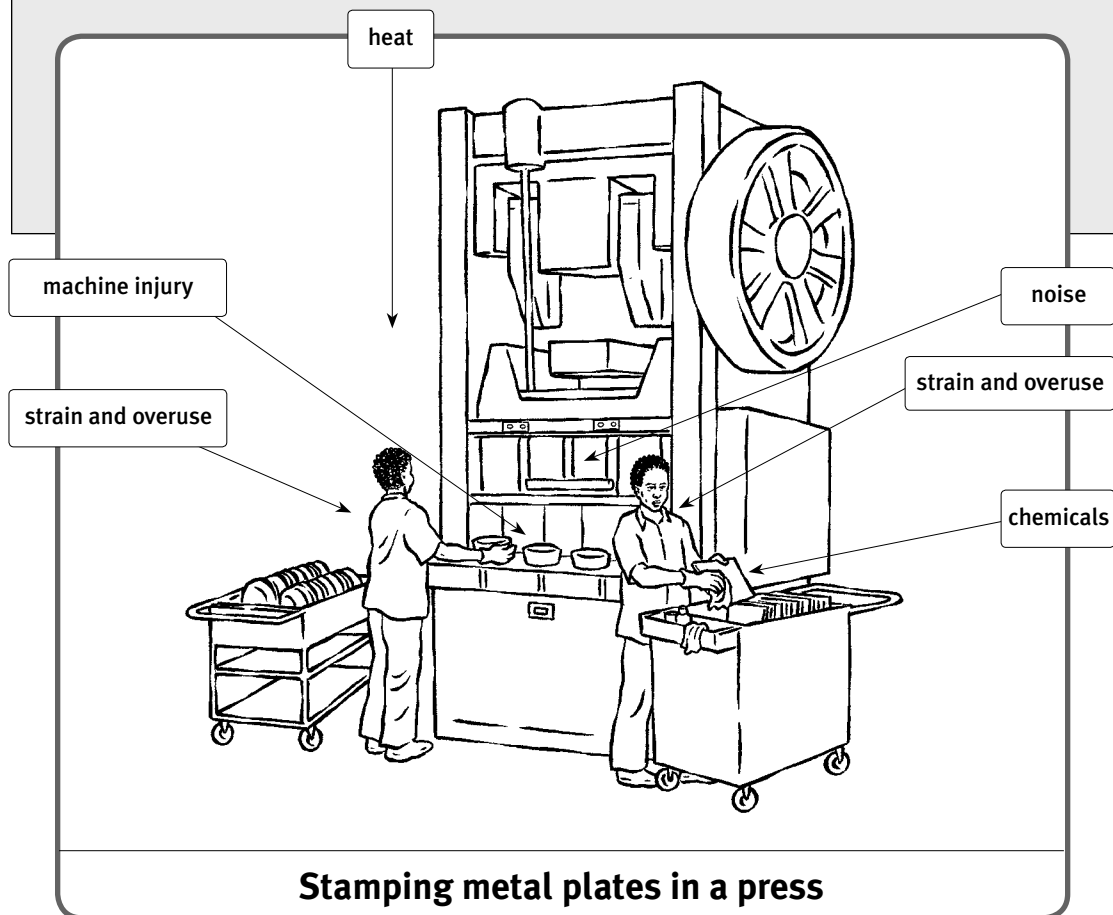
FORMING MATERIALS BEFORE ASSEMBLY

For most products, workers often do one or more of these tasks:

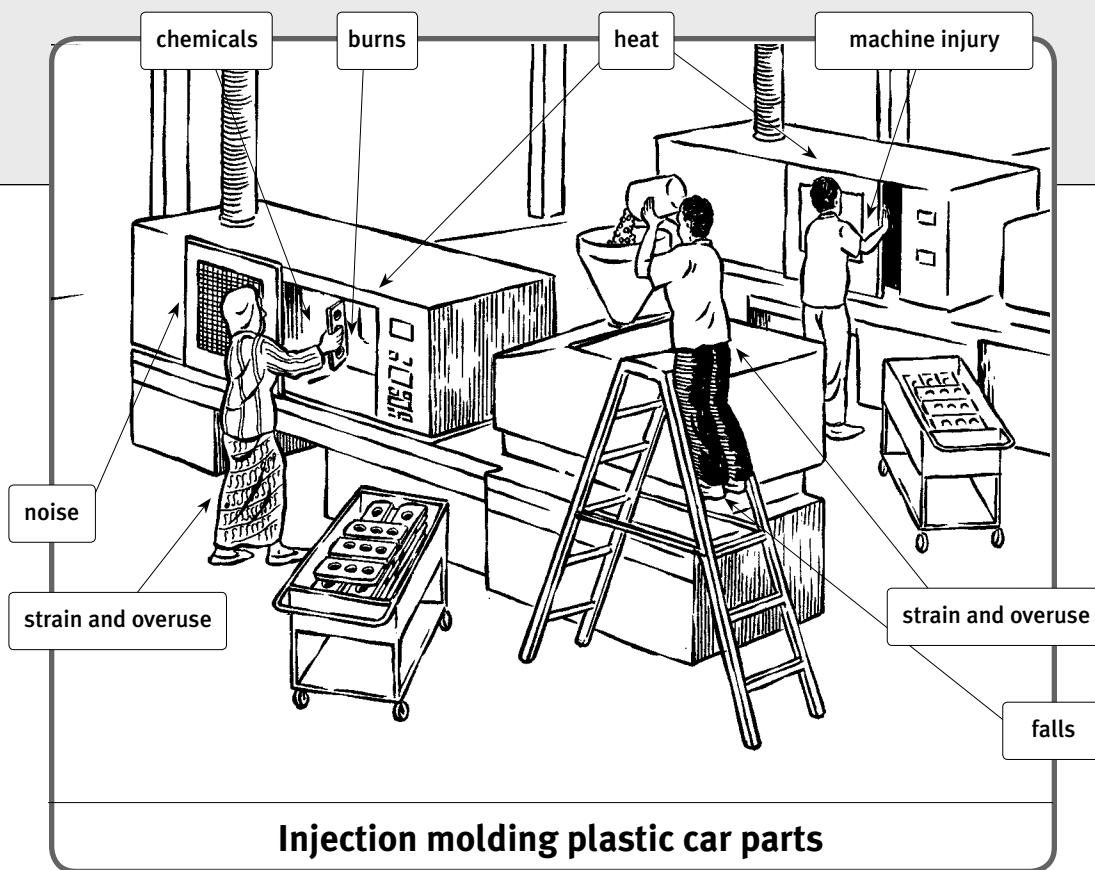
- **cut** fabric, wood, metal, leather, or synthetic materials.
- **mold raw plastic** into parts by injection, blowing, or rotational molding.
- **die cast** molten metal into parts.
- **drill, punch, stamp, and bend** metal, wood, or plastic pieces into parts.
- **trim, grind, or sand** plastic, metal, or wood parts after they have been formed.
- **clean or degrease** parts after they are formed.

Dangers include:

- **strain and overuse** from standing all day; from reaching, lifting, pushing, pulling, and bending to load, unload, and operate machines; from lifting and carrying parts and supplies; from holding parts and tools; and from doing the same tasks many times each day.



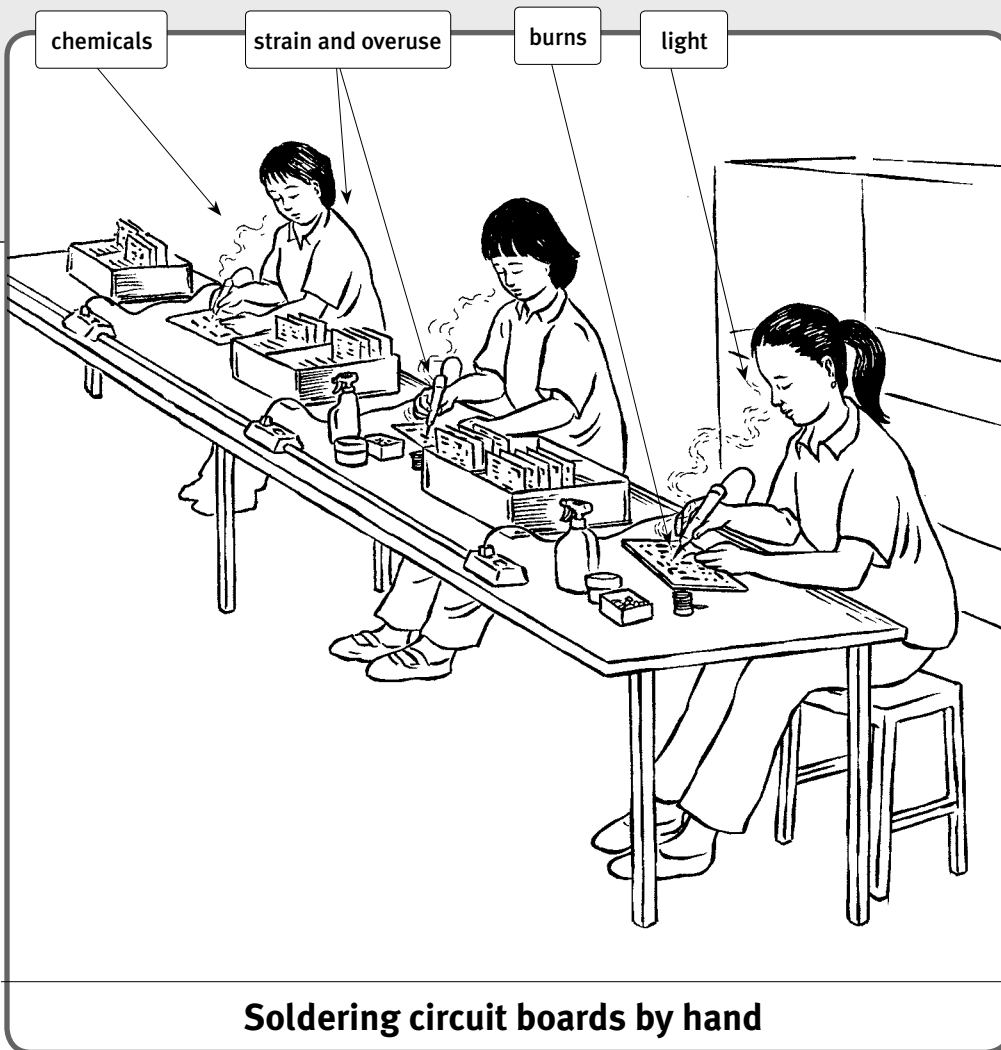
- **chemicals** from metalworking fluids, welding fumes, hot plastics, cleaners, fluids used to separate plastics from molds, and other substances.
- **dust** in the air from cutting, grinding, knocking out, cleaning, and sanding parts.
- **machine injuries** from sharp or moving machine parts that can cut, crush, or amputate a hand, an arm, or other part of the body, or from debris flying into the eyes, face, or skin from grinding, trimming, or using force on parts. Debris or liquids can also spray from machines that jam or break down.
- **burns** from hot machinery, hot plastic or metal parts, hot oil, or hot material leaking from equipment.
- **noise** from grinding, shaping, or bending materials, or from operating machinery.
- **heat** from working around hot equipment in a poorly ventilated work area.
- **falls** from a ladder or raised platform while loading a machine or reaching materials on high shelves, or from tripping over equipment or debris, or slipping on wet or sticky floors.



BONDING MATERIALS TOGETHER

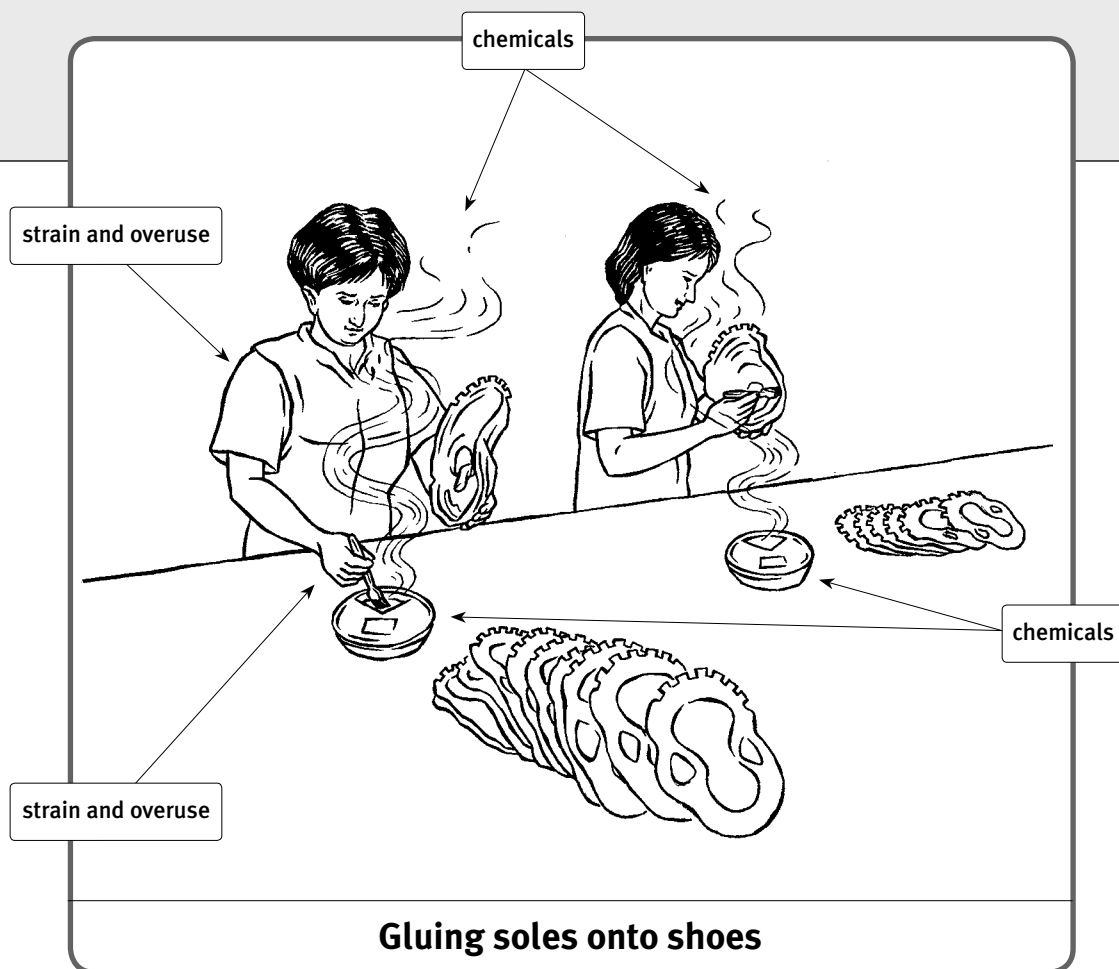
Before materials are assembled, or as part of making the final product, workers often:

- **weld** metal parts together.
- **solder** electrical parts together.
- **glue** materials together.
- **solvent bond** plastic, rubber, or other synthetic materials to each other.
- **ultrasonic weld** plastic or metal parts together.
- **hot melt or fuse** together surface decorations, layers of materials, labels, or soles of shoes with heat or RF (radio frequency).



Dangers include:

- **strain and overuse** from standing all day; from reaching, lifting, pushing, pulling, and bending to load, unload, and operate machines; from lifting and carrying parts and supplies; from holding parts and tools while soldering, welding or gluing them together; and from doing the same tasks many times each day.
- **chemicals** from solder paste, welding fumes, solvents, glues, and cleaners.
- **burns** from hot equipment and materials, and from soldering and welding.
- **noise** from ultrasonic welding equipment.
- **light** from welding, and poor light when connecting very small parts.
- **heat** from working around hot equipment in poorly ventilated areas.



COATING PARTS, FABRIC, OR THE FINAL PRODUCT

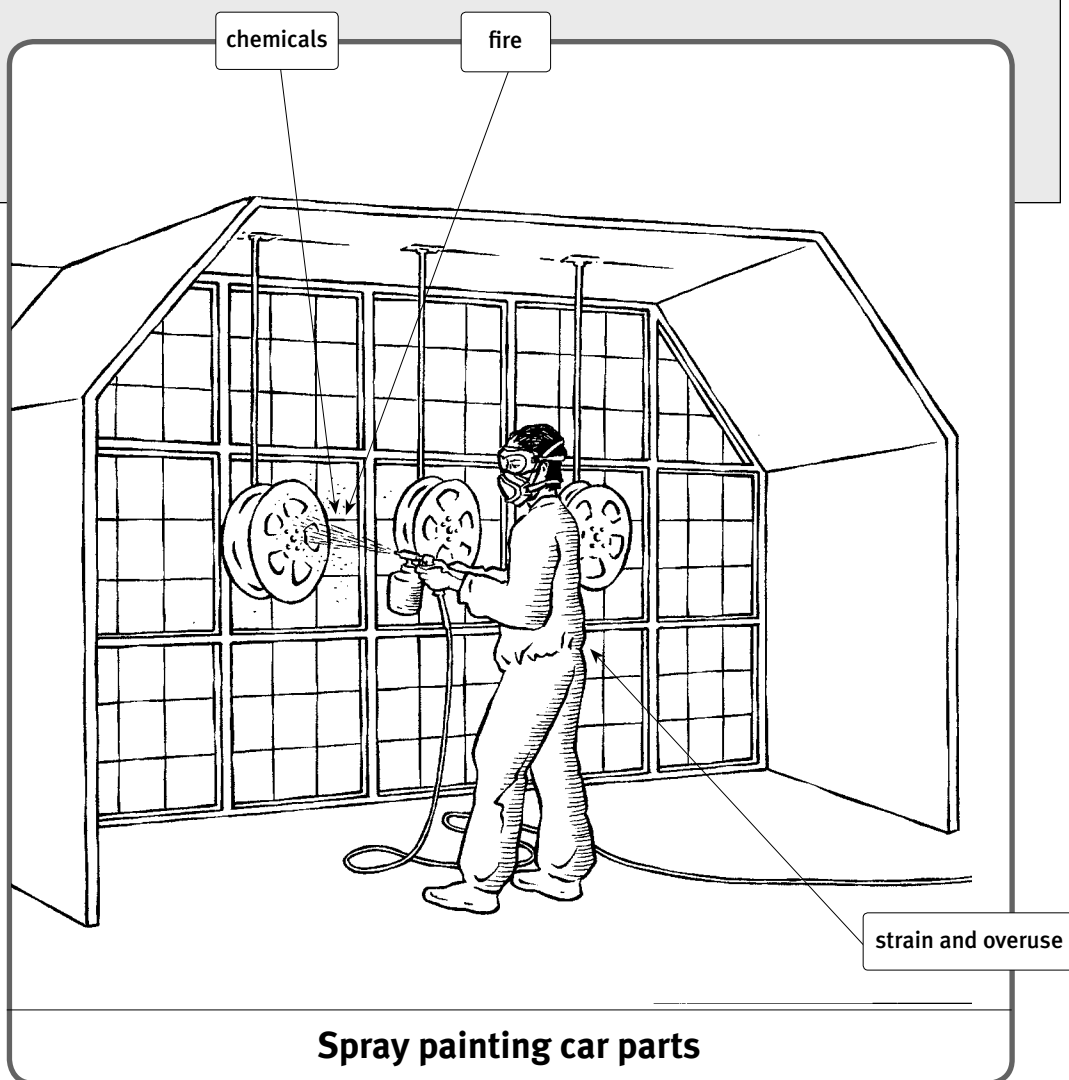
Before or after some products are assembled, workers:

- **dip, spray, or brush** coatings or protective treatments, such as paint, dye, primer, texture, anti-static, insulating, water proofing, or fire proofing.
- **silk screen or decorate fabrics** with a dye, pattern, or textured finish.
- **metal plate and metalize** surfaces by dipping or spraying them with chrome or other metals.

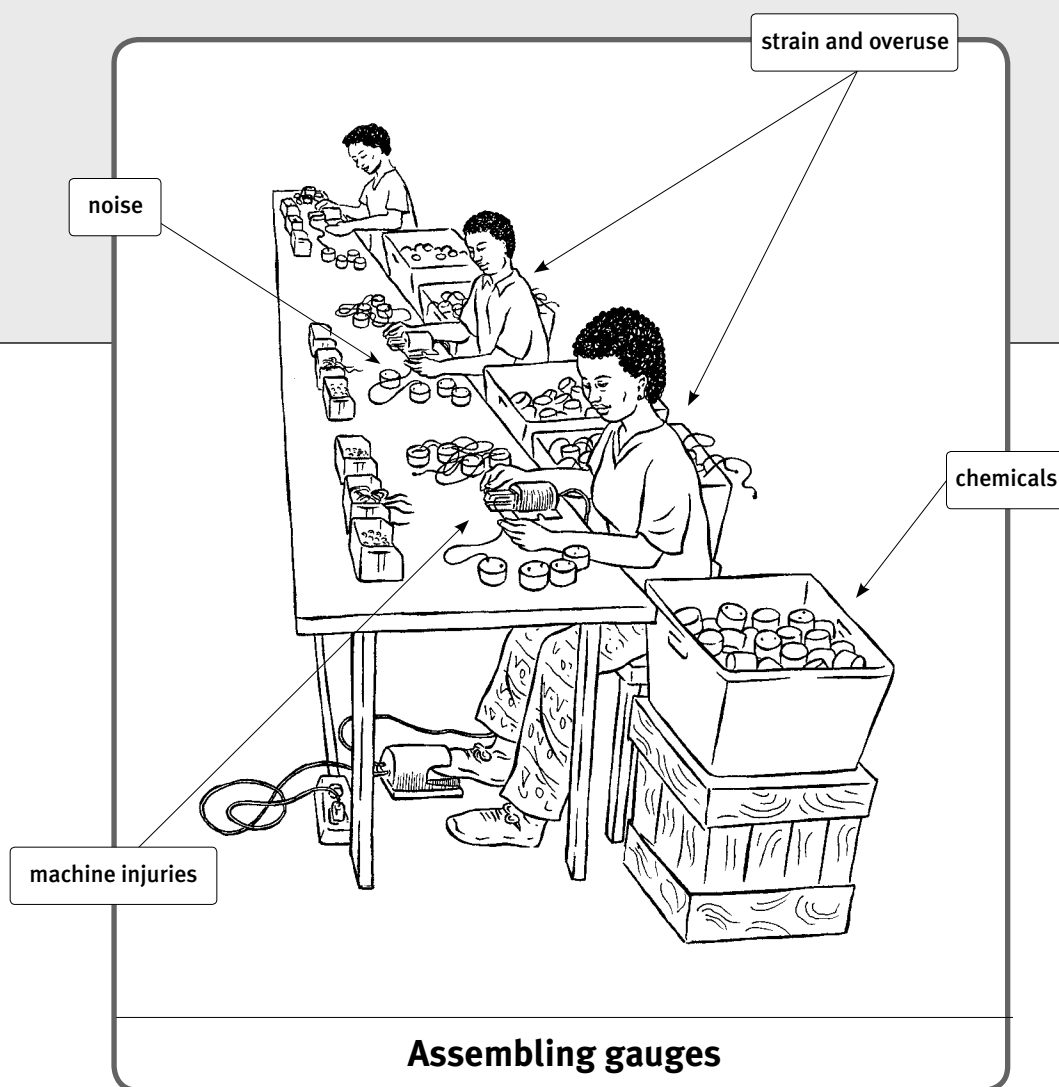


Dangers include:

- **strain and overuse** from standing all day; from reaching, lifting, pushing, pulling, and bending to load, unload, and operate machines; from lifting and carrying parts and supplies; from holding parts and tools; and from doing the same tasks many times each day.
- **chemicals** from coating materials, such as primer, paint, additives, anti-oxidant, sealant, polish, metalizing and metal plating baths and materials.
- **fire** from flammable solvents and other chemicals in coatings.



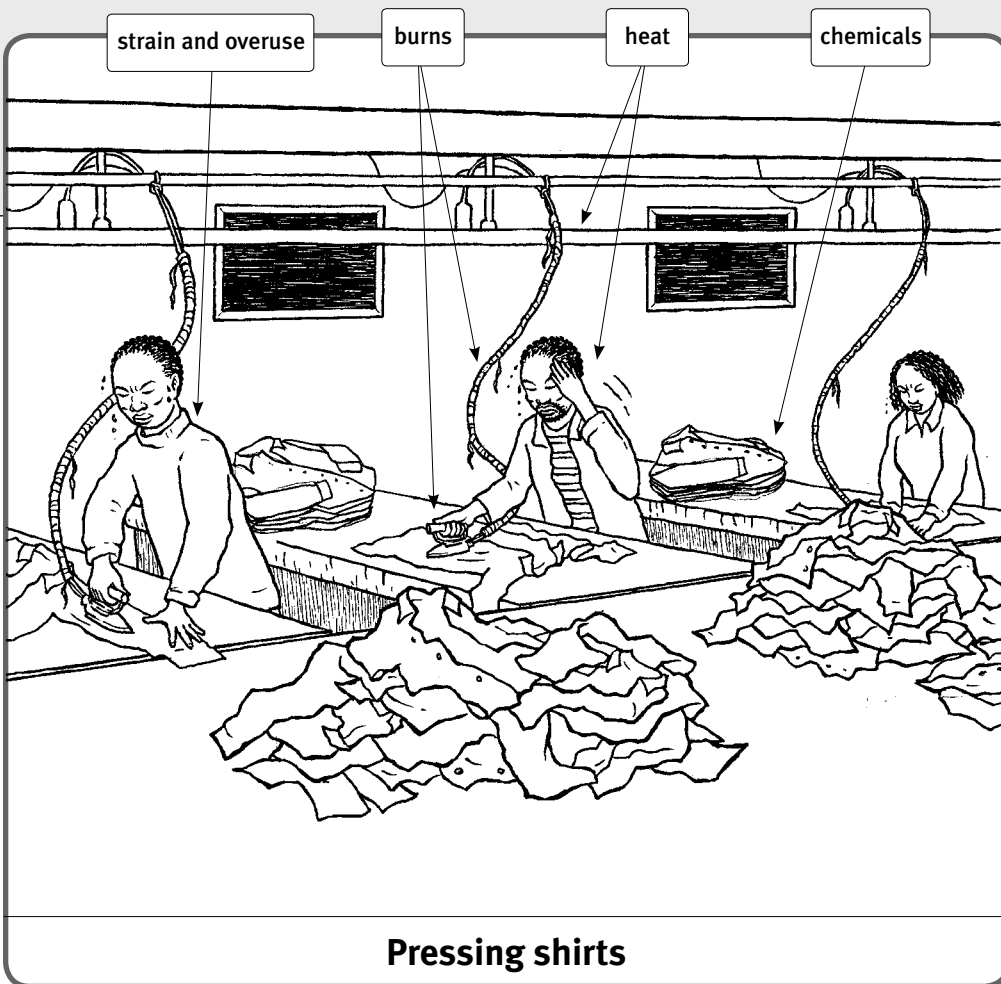
- **chemicals** cleaners, oils, and finishes on parts being handled for assembly, and adhesives or cleaners used during assembly.
- **dust** from handling, trimming, and grinding parts.
- **machine injuries** from sharp or moving machine parts that can cut, crush, or amputate a hand, an arm, or other body part, or from, debris flying into the eyes, face, or skin from grinding, trimming, or using force on parts. Debris or liquids can also spray from machines that jam or break down.
- **noise** from machines.



FINISHING AND CLEANING

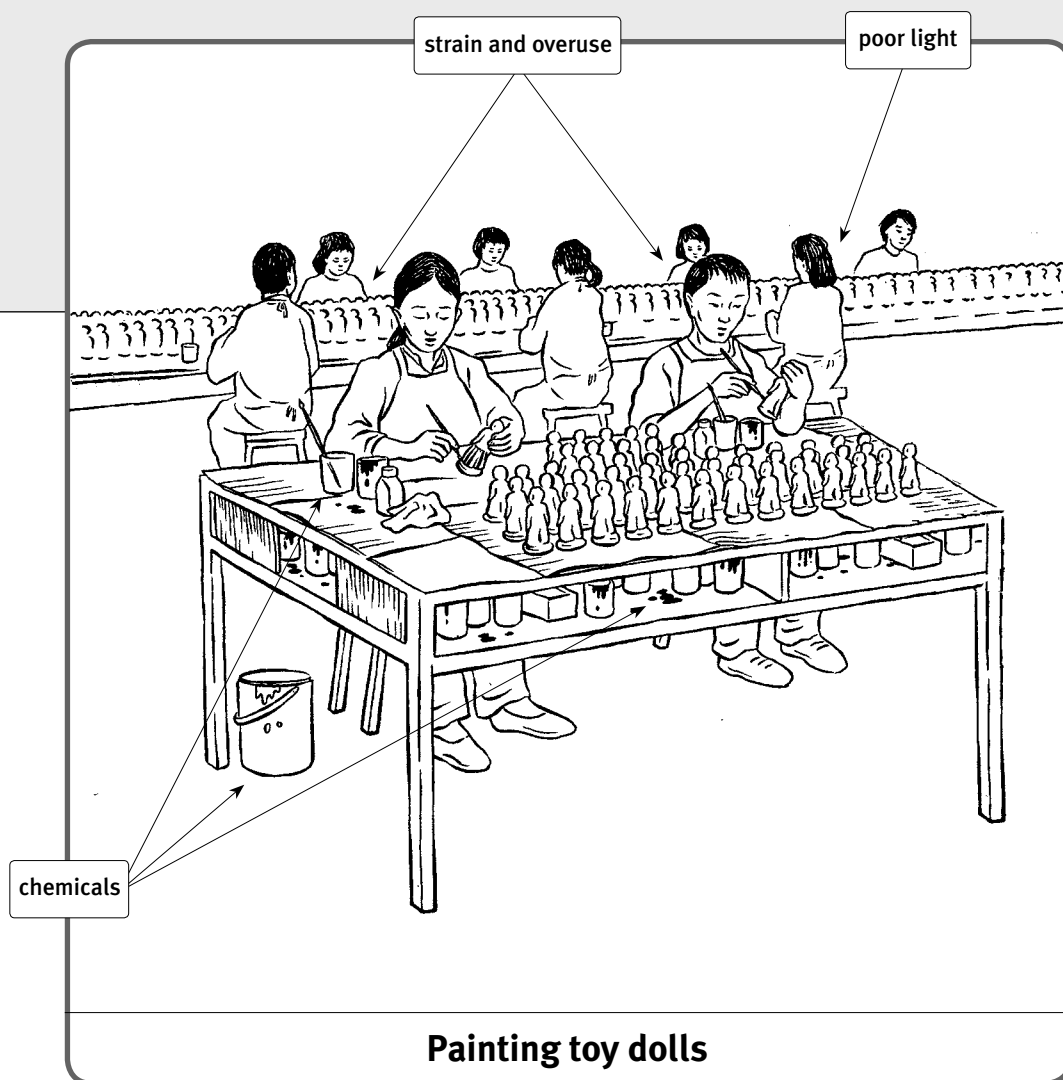
To put the finishing touches on the assembled product, workers:

- **hand paint and glue** final details onto the product.
- **attach stickers or labels** to the finished product.
- **press** fabrics after assembly.
- **hand sew** final details on sewn products.
- **hand repair** flaws from production and assembly.
- **spot clean** dirt, oil, or other unwanted material with chemicals, water, soap, cleaners, brushes, cloth, or tools.
- **polish** surfaces using chemicals and a cloth, or a buffing machine.
- **fold, fasten, or arrange** the product for packaging.



Dangers include:

- **strain and overuse** from fine finger and hand work to finish details and clean the product.
- **chemicals** such as paint, glue, cleaner, or polishes.
- **heat** from hot equipment, such as an iron, a garment press, or a hot air blower.
- **burns** from hot equipment, materials, or steam.
- **poor lighting** that makes it difficult to see detailed finishing work.



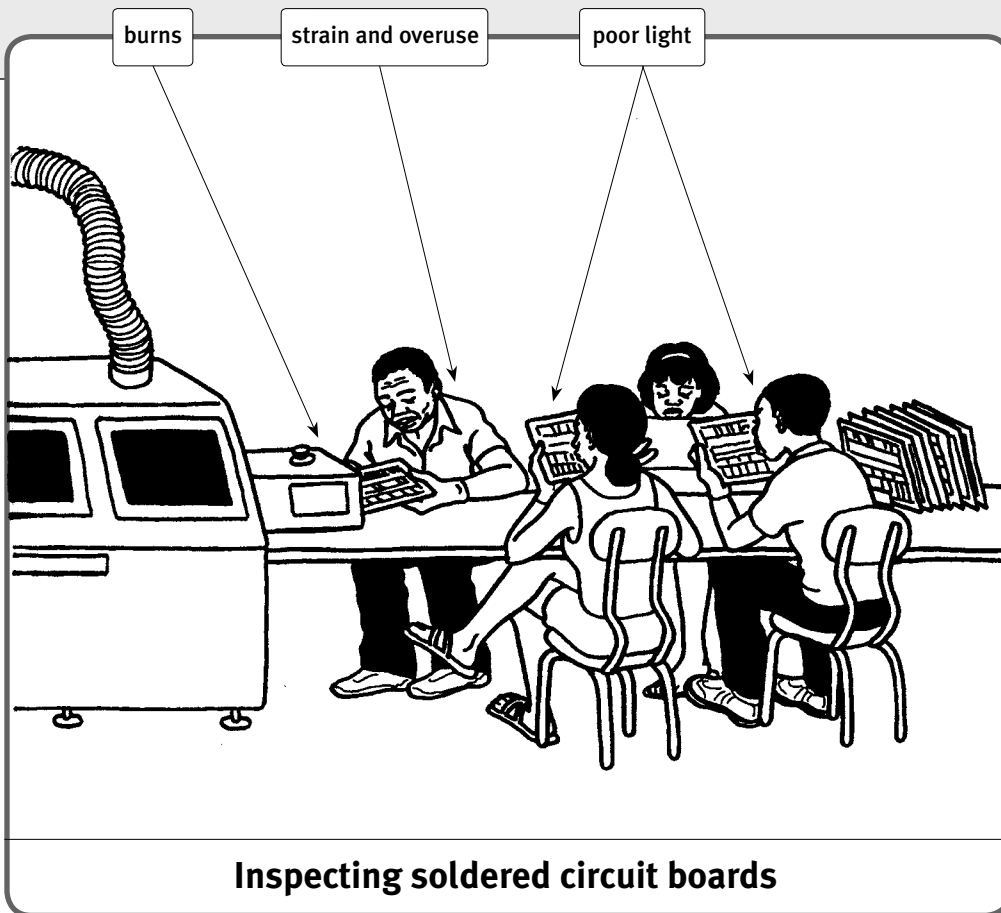
Testing and inspecting

During assembly and after the product is finished, workers usually:

- **inspect** the product with their eyes or with a microscope, and by hand, to see if the quality meets factory standards.
- **test** the product electronically or in other ways to see if it works properly and meets technical standards.

Dangers include:

- **strain and overuse** from making the same movements over and over again, such as picking up, handling, or looking at the product; or operating, testing, or inspecting finished electronic or mechanical equipment or parts.
- **poor lighting** that make it difficult to see the product or to use testing or inspection equipment.
- **burns** from hot products coming out of machines, such as wave soldering.

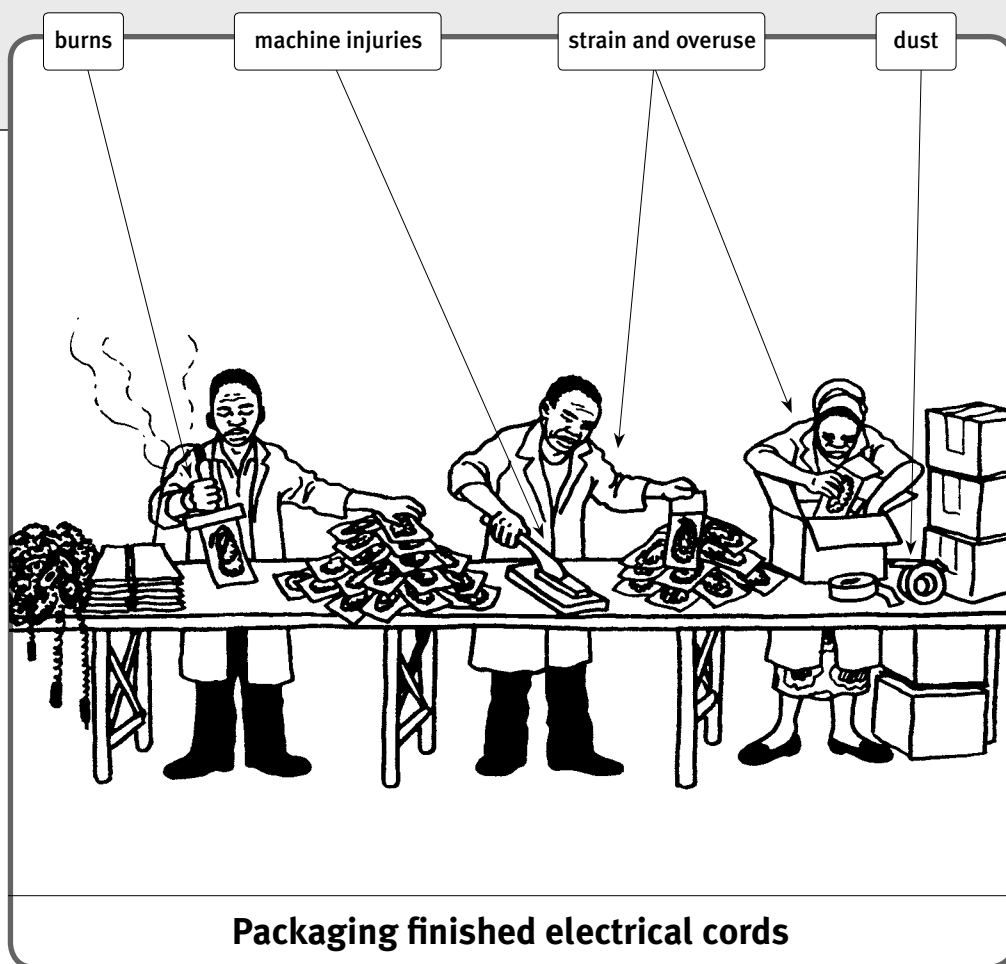


Packaging

Workers **fold, tie, fasten, and insert** the product into a box, bag, or other container for storage, shipping, and display.

Dangers include:

- **strain and overuse** from making the same movements over and over again, and from working in an uncomfortable position for many hours.
- **chemicals** on products and packaging.
- **dust** from packaging materials, especially paper.
- **machine injuries**, such as cuts and bruises, from staplers, cutters, and other packaging equipment, and from packing materials with sharp edges.
- **burns** from melting packaging materials together.



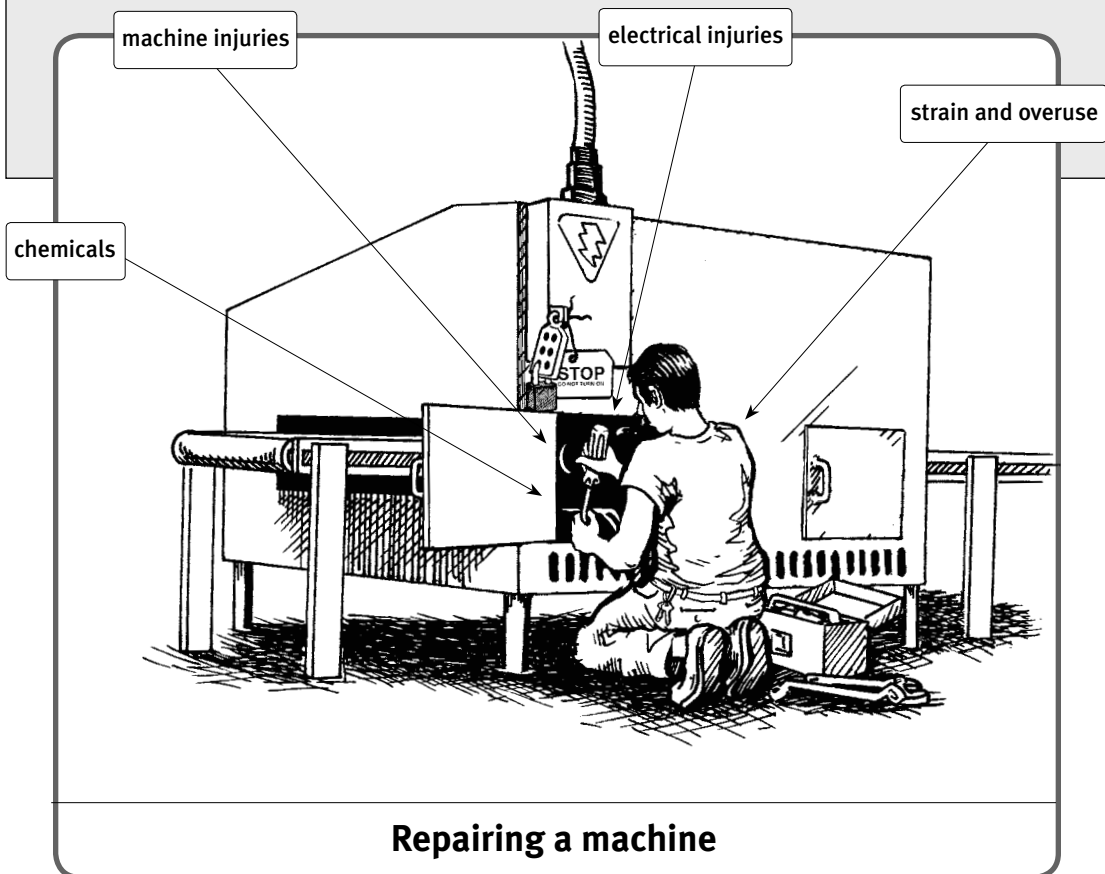
Maintaining and repairing machines, tools, and work areas

Workers face fewer dangers when all equipment and the factory building are kept clean and in good repair. Regular maintenance includes:

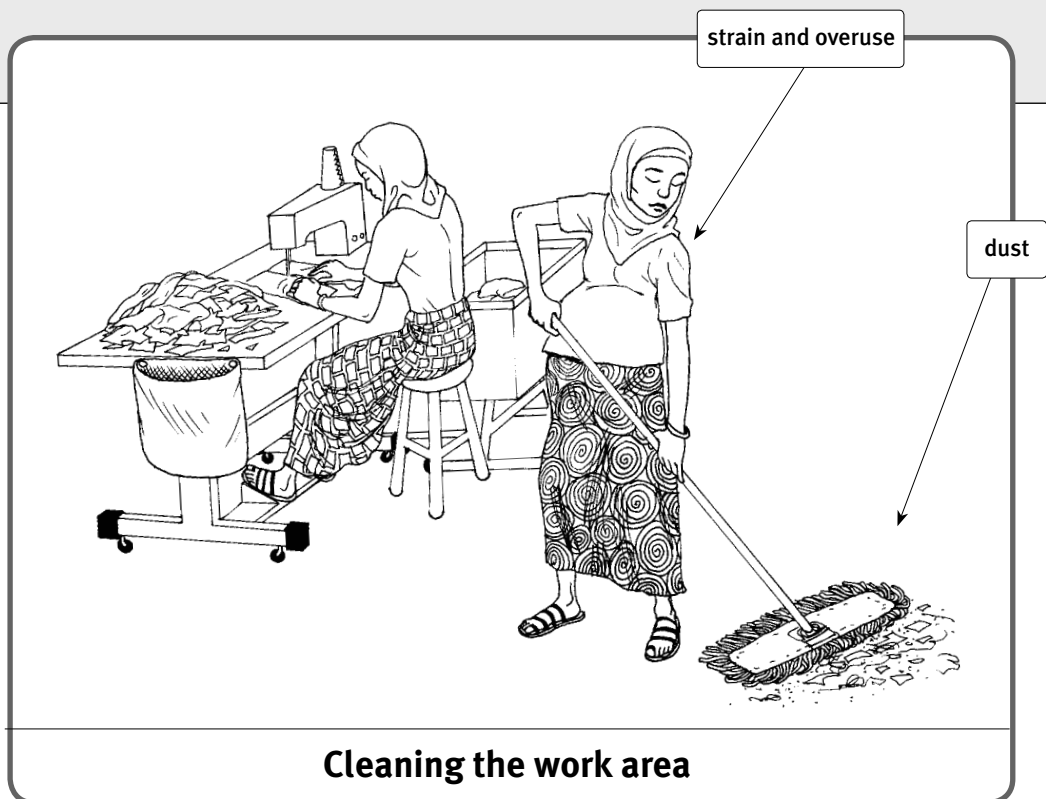
- **adjusting, cleaning, and repairing** tools, machines, and ventilation systems
- **removing dust, debris, waste, and spills** from floors, walls, and windows
- **maintaining and repairing** lights, electrical wiring, doors, windows, stairs, fire alarms, fire extinguishers, plumbing, and the water supply
- **keeping passageways and exits clear** of materials and supplies
- **storing flammable material away from heat or sparks**

Dangers to workers doing maintenance and cleaning include:

- **strain and overuse** from trying to free stuck parts, badly designed job tasks, or using the wrong tools.



- **chemicals** in cleaners, paint, or welding fume, or from leaks, spills, and residue on equipment.
- **dust** from cleaning floors and other surfaces, and from repairing dust-catching equipment and ventilation systems.
- **machine injuries** from machines that are not locked and blocked for maintenance, from trying to free stuck parts or from using the wrong tools.
- **electrical injuries** from machines that are not locked out for repair, and from improperly wired machines and electrical outlets.
- **burns** from hot equipment.
- **heat or cold** if cleaning and maintenance are done after hours when heating or cooling systems are turned off, or from working outside the building.
- **falls** from ladders or platforms used to reach high windows, lights, fans, ventilation systems, overhead conveyor systems, and other areas above the floor.



Make work safer by getting rid of dangers

The best solution to a health and safety problem at work is the solution that eliminates the danger completely. Some solutions are simple and easy to achieve. Others require a long, difficult struggle. You can often make improvements that reduce some danger while you continue the struggle to get rid of all dangers. A good short-term solution protects workers now and can win the support of more workers for a long-term solution.

Even when you win one solution, there are always more improvements to be won. A solution that seems good enough at first may create a new, unexpected problem. You may need to try more than one solution until you find the one that works best for you and your coworkers.

The information in this chapter will help you identify work dangers in your factory and solutions that can reduce or eliminate those dangers. We show a variety of solutions to give you options and ideas for changes you can try in your factory.

STRATEGIES FOR SAFER WORK

A boss can respond to the dangers of a specific task in different ways. Which strategy does your boss use? Which would you prefer to use?

The boss just yelled at me to work faster, but I feel sick from these fumes, and my legs are so tired from standing all day.

Do Nothing Strategy. The boss may deny the work is dangerous and do nothing. When one worker becomes injured or ill, he will get rid of her and hire someone else.



This is what I get for complaining that the cleaner makes me feel sick and makes my hands red and sore.

Change the worker strategy. Or the boss may try to change the worker by making her do the work differently or forcing her to wear uncomfortable safety equipment.



I feel much better since we talked about making this job safer! The new brush cleans the parts better, too.

Change the workplace strategy. A good boss will change the workplace by fixing or replacing equipment, tools, and processes to eliminate dangers and make the work safe.

