

Student Ambassador Program

To The Teacher/ Discussion Leader:

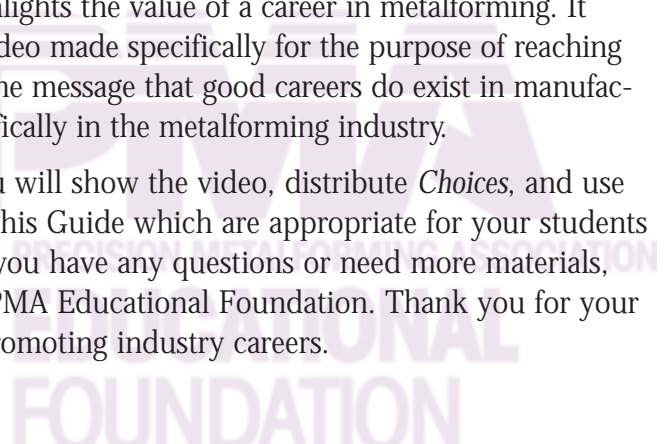
Products made by the metalforming industry are found all around us—in our homes, schools and other public buildings, factories, offices, cars; they are everywhere we look. Much of the industry is invisible because metalformed parts are most often components of larger, more obvious end products. A typical 4-bedroom house, for instance, might include as many as 150,000 metalformed parts, including parts in your kitchen appliances, furnace, fixtures, etc.

Career opportunities in the industry have also been invisible. Students have access to a great deal of information on colleges and on careers that colleges prepare a student for. Unfortunately, there is very little career information for those who wish to begin a career right out of high school or wish to begin work immediately, learning a skill while continuing their education. Many of these students are left to explore career choices without a great deal of information about their options.

The Precision Metalforming Association (PMA) is the metalforming industry trade association, with 1600 member companies. The PMA Educational Foundation's *Student Ambassador Program* highlights the value of a career in metalforming. It includes a video made specifically for the purpose of reaching youth with the message that good careers do exist in manufacturing, specifically in the metalforming industry.

We hope you will show the video, distribute *Choices*, and use elements of this Guide which are appropriate for your students or group. If you have any questions or need more materials, contact the PMA Educational Foundation. Thank you for your interest in promoting industry careers.

**Teachers' Guide
for Careers in
Metalforming
video & Choices
publication**



The Precision Metalforming Industry

What is the precision metalforming industry?

- It is the industry that gives utility to sheet metal by shaping it using tooling in machines.
- Its annual sales are greater than \$41 billion.
- It employs approximately 380,000 Americans.
- Metalforming processes include metal stamping, sheet metal fabrication, slide forming, metal spinning, and roll forming. A brief description of each of these processes is in order:

Metal Stamping utilizes mechanically or hydraulically powered presses ranging in size from those required to form small electronic components to huge presses used in the production of large automobile side panels. Continuous strips of metal or individual blanks are positioned in the press and shaped between tooling forced into the material by a powerful ram. (The stapler on your desk forms metal parts in much the same way that a press does.)

Sheet Metal Fabrication covers a variety of metal forming operations such as Press Brake, CNC Turret Punch Press, and Laser Cutting. Most Press Brakes are manually fed by an operator who holds a metal workpiece between a punch and die and against a gauge to provide a pre-set bend or series of bends in the metal, making it ideal for producing bent parts such as enclosures and cabinets. A CNC Turret Punch Press is used to sequentially punch a series of shapes or parts, following a computer-controlled blueprint. Laser Cutting utilizes a powerful, highly focused beam of computer-guided light to fashion the desired shape from materials up to 1/2" thick.

Slide Forming is a continuous stamping process that can convert metal strip or wire into small, intricate curved shapes, such as springs and electronic connectors. Stock is fed into the slide forming machine where it is cut into blanks and then bent around a mandrel by a number of cam driven forming tools to create the desired shape.

Metal Spinning produces hemispheres, cones, venturis, and other similar shapes from flat metal discs or blanks which are rotated on a lathe and pressed against a tool to duplicate its shape.

Roll Forming is a continuous bending operation where a sheet or strip of metal passes between one or more sets of rotating dies to create shapes such as channels, angles, or panels.

Applications

Here is a listing of just a few of the many products which include metalformed parts:

Auto Manufacturing	Car Bodies, Motors, Transmissions, Pulleys, Brakes, Fenders, Bumpers, Pistons, Valves, Handles, Motorcycles
Construction (Buildings and Roads)	Bulldozers, Derricks, Paving Equipment, Window Frames, Doorknobs, Keys and Keylocks
Cosmetics	Tweezers, Lipstick Cases, Powder and Pill Containers, Eyeshadow Tubes, Combs, Brushes, Razors, Razor Blades
Education	Ballpoint Pens, Staplers, Projectors, Buzzers, Bells, Chairs, Pencil Sharpeners, Computer Components, Copy Machines, Paper Clips, Desks, Chairs
Farming	Plows, Tractors, Combines, Fencing, Pitchforks, Shovels, Milking Machines, Axes
Medical	Beds, Hypodermic Needles, Earplugs, Scalpels, Depressors, Trays, Scales, Dental Tools
Toys/Recreation/Leisure	Musical Instruments, Skateboards, Dolls, Transformers, In-Line Skates, Hot Wheels, Exercise Equipment, Video Cartridges, Bicycles, Drums

Careers in Metalforming

As emphasized in the video, metalforming careers are available to people from all backgrounds. Its skilled professionals receive above-average earnings, opportunities for rapid advancement, challenging work, and ongoing training in a clean, safe environment. Why not contact a metalforming company in your area to arrange a tour or a presentation for you and your students. For a list of companies in your area contact the Precision Metalforming Association Educational Foundation, 6363 Oak Tree Boulevard, Independence, OH 44131, phone: 216/901-8800, fax: 216/901-9190, web site: www.metalforming.com, or e-mail: pmaef@pma.org.

Quiz

Here are some sample questions which you can incorporate into a follow-up quiz, or you can make up your own to meet the needs of your group.

- Q. Look around and outside the room and name 10 things you see which include a metalformed part.
 - A. Answers are in the listing above (plus many, many more).
 - Q. Match the product in the right-hand column with the process by which it is manufactured in the left-hand column.
 - 1. Metal Stamping
 - 2. Metal Fabrication
 - 3. Slide Forming
 - 4. Metal Spinning
 - 5. Roll Forming
 - A. Springs
 - B. Gutters (Channels)
 - C. Metal Cones
 - D. Automobile Side Panels
 - E. Computer Cabinets
- A. 1./D 2./E 3./A 4./C 5./B

Quiz (con't)

- Q. Define metalforming.
A. It is the industry that gives utility to sheet metal by shaping it using tooling in machines.
- Q. What is a tool & die maker?
A. A skilled operator of machine tools who creates and maintains the tooling, fixtures, and equipment necessary for metalforming.
- Q. What skills are necessary to become a machine operator?
A. Basic math, problem solving, reading and writing, communication, computer, teamwork.
- Q. What are the benefits of a career in the metalforming industry?
A. Good pay, competitive benefit packages, stability, portability of skills, opportunities for training, potential for rapid growth, challenging work, job security.
- Q. What is the average annual income for the metalforming industry, not including benefits?
A. \$20,000 B. \$50,000 C. \$33,000 D. \$18,000 E. \$42,000
A. C. \$33,000
- Q. What is the value of the Transfer Press referred to by the operator in the video?
A. \$120,000 B. \$500,000 C. \$50,000 D. \$5 million E. \$2-1/2 million
A. D. \$5 million
- Q. Skills learned in the metalforming industry are transferable throughout the country.
True False
A. True

Activities

1. Ask individuals in your group to go to the library, look in the help wanted section of an out-of-town Sunday newspaper, and count jobs listed under tool & die and the metalforming processes mentioned in this program.
2. Contact a nearby metalforming facility (contact PMA or visit its website at www.metalforming.com for a list of member companies in your area) to arrange a plant tour and have your group members write a report on what they saw.
3. Have them look around their houses and list things that might be metalformed.



6363 Oak Tree Blvd.
Independence, OH 44131
Phone: 216-901-8800
Fax: 216-901-9190
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E-mail: pmaef@pma.org