

Manufacturing Green in Precision Metalworking

An NTMA Technology Team
Member Training Program



Intro to Green

- When we think about our shops being green we feel that it would cost more that it would benefit us.
- In reality becoming green can actually save your company money.
- There are many simple and commonsense green things that we all can do with very little effort.
- The following NTMA Green Program will help give you ideas on manufacturing green.
- If we all become a little greener we can make a difference.
- A Green Manufacturing Worksheet that your company can use to monitor green activities is also available.

Landscaping

- Using native plants can reduce the watering.
- Keep the grass over 2" long.
- Capture rainwater from your down spouts to use to water plants and grass.



Lights

- Changing out fluorescent tubes to T8, and replacing the transformer to digital will reduce heat and lighting costs.
- Turning off light when not in use will help.
- Motion activated lights switches that turn on and off based on motion in restrooms, lunch, storage rooms and offices will reduce energy.
- External spot or floodlights with photo and/or motion sensors to control the lights during night will also reduce costs.

Windows

- Replacing old outdated single pane windows with double or triple pane windows will save energy.
- Newer windows will also let more light in.
- Cleaning windows will also help.

Natural Lighting

- Adding windows to bring in light will reduce energy.
 - Too many may reduce the energy savings.
 - Helps with employee moral.
- At night and in summer shades will improve the heat or cooling efficiency.

Computers

- Turning off and unplugging computers at night will reduce energy consumption.
 - May eliminate any damage from night electrical storms.
- Replacing the old CRT monitors with Flat screen will reduce energy and heat.
- Use power strips to easily power down computers, printers and monitors.

Machines

- Power down all unused equipment.
 - Equipment that is powered up and not running still draws power.

Chargers

- Unplug all device and/or battery chargers when not being used; they draw power even if not used.



Water based Coolants

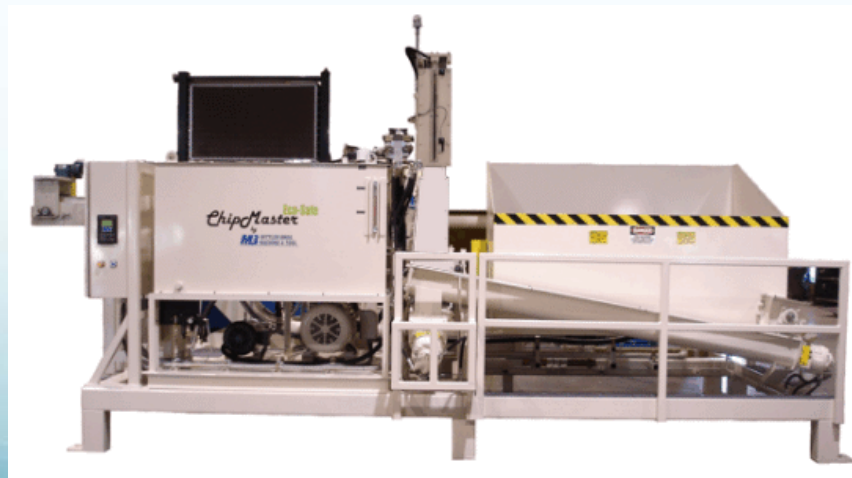
- Use vegetable or biodegradable coolants; they require less chip washing.
- Use a water evaporator to reduce disposal costs.
 - You can make an evaporator using a 55 gal. steel drum and a drum heater. Caution: Set this up in an metal out building as there is always the possibility of a fire.
- Use a tramp oil skimmer to aid in disposal cost.

Cutting Oils

- Use vegetable or biodegradable coolants. Petroleum or synthetics add to disposal cost and are not renewable.
- Using reduced volume applicators or spray units can in some cases reduce cutting fluid usage by a factor of ten or more.
- On light duty work add plastic blocks to the coolant tank to reduce volume. Note: This might cause the coolant to heat up faster affecting the part thermal expansion.

Chips

- Always recycle chips, even in the smallest amount.
- Using vegetable or biodegradable coolants, makes the storage and selling of chips easier.
- For large chip generators, invest in a chip compressor to reduce storage and creating higher resale value.



Waste water

- If possible skim and filter your wastewater.
- Even running it through a settlement tank will reduce metals getting into the treatment plants.

Wipe vs. Shop Rags

- The reusable shop rag should be used over disposal wipes.
- However, if the wipes are made from recycled product it may be greener to use.
 - Even greener if you can recycle the disposable whips

Part cleaning

- Change from solvents to biodegradable cleaners such as Simple Green.
- Using ultrasonic cleaners will clean parts faster than solvents.
- Air drying instead of using heat or compressed air is a slower process, but uses much less energy.



Paper

- Reduce paper usage by using email, which should reduce the need to make copies.
 - Try not to make paper copies of the emails.
- Making drawings, specifications and manuals into electronic copies will reduce paper.

Housekeeping

- Repairing leaking shields and tanks will reduce cleanup cost and materials.
- Use catch trays to catch coolant or oil instead of oil dry.
- Use reusable socks or mats to absorb coolant or oil.



Shipping

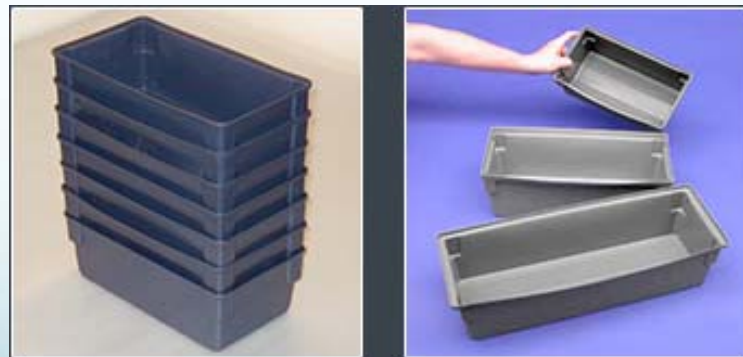
- Reusing shipping boxes for shipping to outside services or for in house product storage reduces the need for purchasing new material.
- Using shredded paper from your office will reduce packing costs.
- Reusable shipping container will help also.
- When purchasing new pallets, consider recycled plastic; they will out last wood.
- Old wood pallets can be given away as firewood instead of going in the landfill.

Travel

- Reduce trips to your customers;
 - By using teleconferencing or video conferencing.
- Group trips together to reduce airline flights.
- Attend online webinars instead of attending trade shows to review new products.

Part handling

- Recycle cardboard boxes when possible.
- Purchase recycled plastic totes.



Lunch Room

- Setup recycling bins to aide in sorting recyclables.



Raw Material

- Purchasing much more raw material than needed creates the need to make more material, including transporting and storing it.
 - Have your vendor provide just in time delivery for needed raw materials.
- Recycle or sell cutoffs.

Tools

- Carbide tools and insert can be sold and recycled.
- Larger tools can be re-sharpened instead of disposed of.

Lean

- Less traveling of the product or employee reduces resources and floor space.
- Using 6S lean and housekeeping will reduce wasted labor.
- Incorporate Manufacturing Cells in your plant layout.

Equipment

- Equipment sized for the job; if the equipment is 4x larger than the average job, it will cost more to operate and wastes floor space.
- Older equipment cost more to operate.
- Incorporate a Preventive Maintenance program.

Air Systems

- Review your compressed air requirements yearly.
 - If your system is too large, you are using too much energy.
 - If your system is too small, it is working too hard.
 - Look into using a variable screw compressor that will adjust for the demand; costs will be reduced for a smaller second or third shifts.
- Review your air system for leaks every 6 months or less.

Maintenance

- Replacing filters will keep air cleaner.
- Maintaining the equipment will make the equipment run more efficient, thus using less power.
- Keeping the floors clear of chips. Reduce cross contamination of different materials of chips producing a higher recycle payback.

Environmental

- Using air and mist filters keeps the environment cleaner.
- Not storing chips or waste products outside reduces the impact on our environment.

Reducing Scrap

- This is one green item that we all actually strive for.
- A good quality system and properly training employees will aid in the reduction of scrap.
- Try to enforce “Check twice and cut once”.

Extra Credit

- Lastly, for those who are really looking to turn green, you can install any of the following systems;
 - Geothermal heat / cooling
 - Solar heat
 - Solar energy (cells)
 - Wind power



Conclusion

- You are probably already be engaged in green manufacturing and did not even know it.
- You might have many other ideas on how your company can reduce its impact on our environment.
- Please use the Green Manufacturing Worksheet to monitor your company's manufacturing green results.
- It would be a much healthier world we can all do a little to reduce our carbon footprint

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Any Questions?