Exercise RECP: How much do you earn from scrap?

You are the manager of a metal manufacturing company. Stahlteil GmbH processes 1,200 tonnes of sheet steel every year for various parts for metal manufacturing customers. The steel cost you 500 euros per tonne in purchasing. **In stamping** in 2018, 358 tons of sheet metal clippings were generated.

Until now, you have returned the scrap for 10 cents per kilogram to your disposal company. Monthly, 50 EUR rent was paid for the scrap container. For the collection, a fee of 70 EUR per month was charged.

Now, a new metal trader from the region offers you 15 cents per kilogram. He provides the container at no cost and charges 45 EUR per discharge.

Considering the information above, answer the following:

1. **How much do you earn on your clippings with the new returning practice?**
2. **How much do your clipping really cost?**
3. **How could you even improve more clipping returning?**

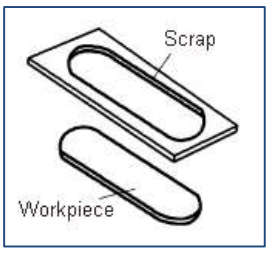
Box 1 shows the general process of sheet steel production by metal stamping process.

Note for the trainer:

This exercise can be used during the introduction on the RECP methodology. Its objective is to stress the RECP focus on preventive practices rather than improving waste handling practices. Although both type of alternatives will generate economic values, the high impact of waste costs from material purchasing as well as the cost of waste production is the first level where RECP options want to be focused on. During the RECP assessments, the main objective of the experts will be to find sources of inefficiencies that generate increased and/or unnecessary resource consumption.
The process description below (box 1) describe roughly some process steps and some consideration that might be causes of inefficiencies.

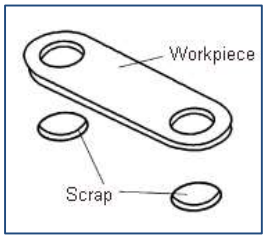
Box 1. Metal stamping process[1]

Metal stamping is a complex process that can include a number of metal forming processes — blanking, punching, bending, and piercing, to name a few. Metal stamping is a linear process wherein a step is performed after another, and so on until a completed part is produced. The best-stamped metal part designs take this step-by-step nature of the stamping process into consideration.



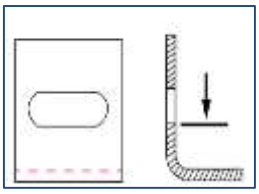
Blanking

- **Blanking** — cutting the rough, basic shape — is often the first step for a stamped metal part. The primary concerns at the blanking stage are minimizing and avoiding burrs, which require secondary processing to remove and can drive up the cost of your part and extend lead time. While burrs are usually not problematic, they can cause dimensional issues in applications with tight tolerances. Tight tolerances often increase burrs that might require additional tooling maintenance and downtime, which adds to the part cost.



Piercing

- **Piercing** is a common metal stamping process for forming holes and slots fully enclosed within the edges of a part. In piercing, the clearance between the edge of a hole and the edge of the part should be at least twice the material thickness. If the edge-to-hole distance is less than this recommended value, bulging at the outer edge of the material can occur.



Bending

- **Bending** is often performed toward the end of the progressive die stamping process. A bent can be included into your stamped metal part. Plasticity is the measure of permanent deformation a material undergoes when subjected to force. The more plasticity a metal has, the easier it is to form. High plasticity metals such as aluminum, brass, copper, and mild varieties of steel are formed easily and may require fewer considerations in regards to bends. If a bend is made too close to a hole, it can become deformed. Notches and tabs, as well as slots, should be designed with widths that are at least 1.5x the thickness of the material. If made any smaller, they can be difficult to create due to the force exerted on punches, causing them to break.

[1] Source: Metal stamping design guide. ESI. Engineering Specialties, INC.

Solution

1. How much do you earn on your clippings with the new returning practice?

From the previous disposal company you received the following amount annually:

Position		Cost (EUR/year)
Container rental	EUR 50 per month	600,-
Collection fee	For each collection EUR 70	840,-
Scrap price (revenue)	Per ton 100 EUR	-35.800,-
Total	Earning	-34.360,-

With the new disposal company, you receive the following amount annually:

Position		Cost (EUR/year)
Container rental	0	0,-
Collection fee	For each collection EUR 45	540,-
Scrap price (revenue)	Per ton 150 EUR	-53.700,-
Total	Earnings	-53.160,-

The profit from the contract change amounts to 18.800,-

2. How much do your clipping really cost?

Position		Cost (EUR/year)
Metal clipping generation	**358 ton per year**	
Steel purchasing cost	**500 EUR per ton**	
A - Metal clipping cost per material purchase	**EUR/year**	**179,000**
Metal clipping waste management costs:		
Container rental	EUR 50 per month	600,-
Collection fee	For each collection EUR 70	840,-

Scrap price (revenue)	Per ton 100 EUR	-35.800,-
B – Waste revenue (net)	Earning	-34.360,-
Total cost of the metal clipping		**144,640 EUR/Year**

3. How could you even improve more clipping returning?

Let us ask ourselves where do metal clippers are generated and why?

Following the brief description of the process and its implications, we could look at the following sources to find prevention measures:

- Avoid tight tolerances during manufacturing. Evaluate your process and determine whether the tolerances need to be as tight as specified. - Potential practice: Better control process/equipment modification.
- Check whether the product design is generating losses because of wrong clearance between the edge of holes and the edge of parts. It might require adjustments to equipment, process or product design - Potential practice: Better control process/equipment modification.
- Analyse the material properties versus other similar material in order to ensure a material with plasticity that reduce burrs and problems with bending parts. - Potential practice: Input material change.