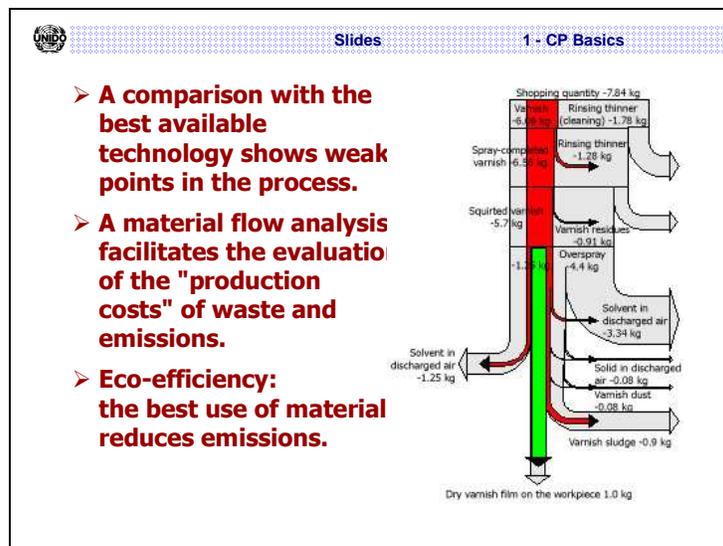
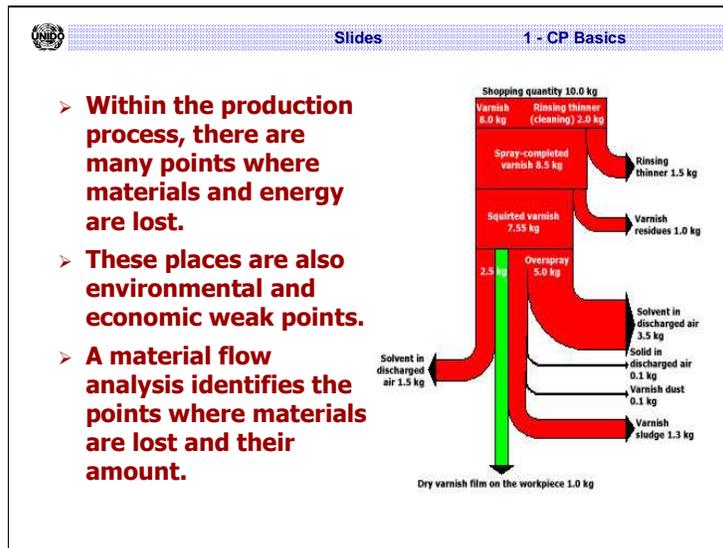


1 – Examples

1-1 Cleaner production in a painting process



During a painting process, such as in a car repair shop, paints and solvents are used to manufacture the product – a painted surface. During a conventional process up to 10 kg of input material are used to apply 1 kg of dry paint on the surface. The remaining 9 kg are lost due to:

- Cleaning of spray guns;
- Paint waste;
- Solvent in the air;
- Particles in the air;
- Paint sludge.

Using the best available technology and best management practices, the same process can be carried out using only 2.2 kg of input material. In this case a bundle of measures has been taken:

- Closed cleaning unit for spray guns;
- Use of HVLP (high volume – low pressure) spray guns;
- Use of paints with a lower solvent content;
- Training of painters;
- Improved work planning (such as more accurate calculation of the required paint).

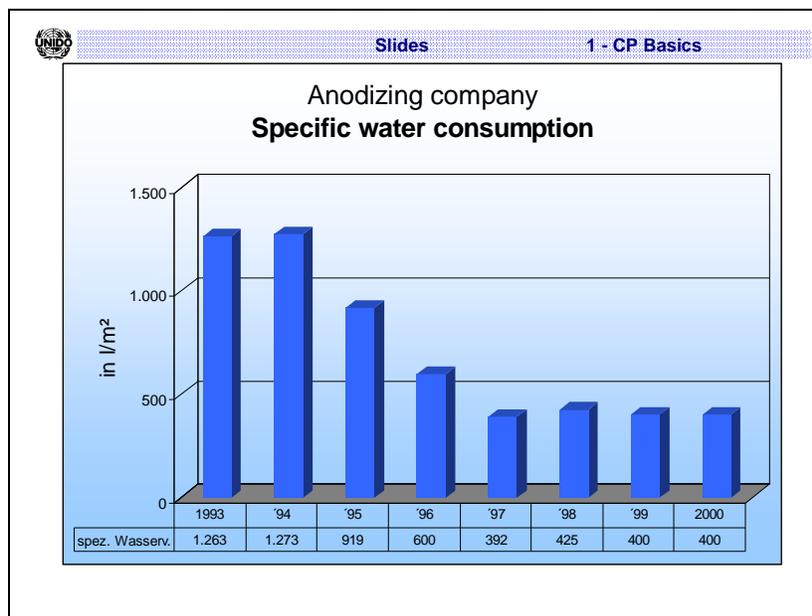
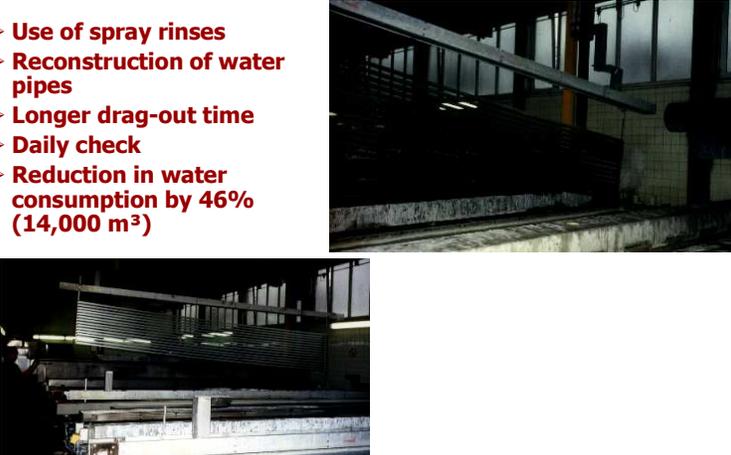
The two Sankey diagrams on the previous pages show the radical reduction in emissions. A subsequent economic analysis has proven that the achieved savings in expensive paint and solvents as well as the reduced costs for waste disposal clearly justify the investment.

1-2 Saving of water and chemicals

UNIDO Slides 1 - CP Basics

Anodizing company

- Use of spray rinses
- Reconstruction of water pipes
- Longer drag-out time
- Daily check
- Reduction in water consumption by 46% (14,000 m³)



A small electroplating company anodizes aluminium. The workpieces are fixed on a special transportation device which immerses them vertically into the different process baths. After every process bath some solution remains on the workpiece, the so-called drag-out. For this reason the workpiece has to be cleaned and rinsed with water. During this process, the chemicals are diluted in the washing water and subsequently transported to the wastewater treatment plant. There the wastewater is treated with chemicals and sludge is generated.

Within this process, reduction at source meant diminishing the drag-out. In addition to the reduced purchasing costs for new process chemicals, savings could also be achieved due to

reduced water consumption for rinsing. Moreover fewer chemicals had to be used at the wastewater treatment plant and less sludge was produced.

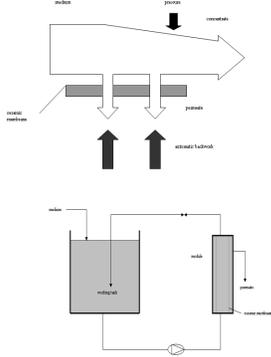
In a first step the drag-out was measured at a weekend together with a manager and a foreman. Simple equipment such as a collecting basin, a bucket and a measuring jug were used. Then different ways of fixing and taking out the workpieces were tested (such as allowing ten instead of five seconds of dripping, taking out the workpieces at a different angle, etc.). In addition, all these data were compared to data from relevant publications. By simple measures with hardly any investment the drag-out was reduced by around 40 to 50%.

Meanwhile – through continuous improvement – the specific water consumption was reduced by more than 66%.

1-3 Ultrafiltration in a car repair shop

UNIDO Slides 1 - CP Basics

Car repair shop



- Installation of an ultrafiltration unit
- Modified cleaning equipment
- Saving of washing agent by 76 %, of water by 80 %

A car repair shop needs to clean oily motor parts regularly. They are cleaned in a closed cleaning machine with an aqueous alkaline solution. Every two to three weeks, the washing solution (2 000 litres) has to be changed and disposed of as hazardous oily waste.

A new ultrafiltration unit continuously filters the solution with a ceramic membrane and removes the oil. Thus the washing solution can be used up to four months. The reduction of washing agent, water and hazardous waste amounts to about 75 to 80%. The necessary investment of EUR 6 000 to 7 000 is recovered after about 11 months.