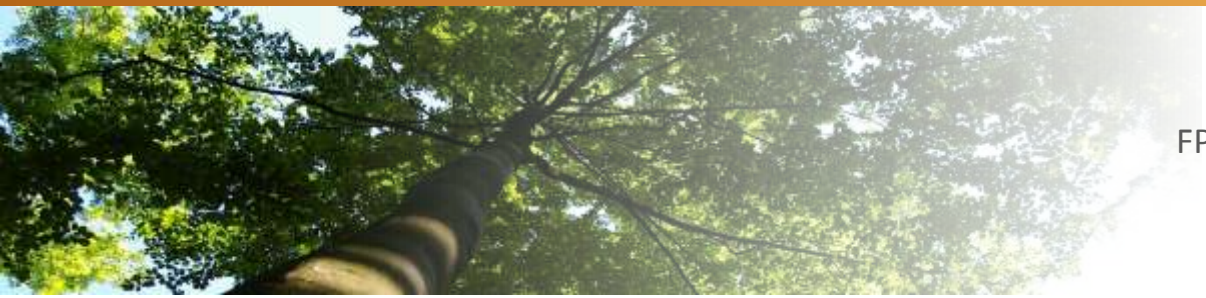

European Commission
FP7 no. 609573, 2014-2016
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RERAM
research to innovation in resource efficiency

How to improve resource use and efficiency in wood manufacturing: Lessons learnt from RERAM's enterprise checks




Mr. Roland Oberwimmer
oberwimmer@holzcluster-steiermark.at
Holzcluster Steiermark GmbH
www.holzcluster-steiermark.at

holzcluster steiermark gmbh

Raw material and Energy efficiency checks in SMEs

Enterprise Reality Checks

- 1-day company visit for a situational assessment
- Audit team of 3 Styrian experts
- Findings report with saving potentials and proposed no/low investment solutions
- Feedback work shops in GE and MD
- Organization of a study trip to Styria for Ukrainian companies
- Follow-up coaching through local and Austrian specialists

Raw material and Energy efficiency checks in SMEs

19 woodworking companies participated: UA 4, MD 4, GE 5, AT 6

Main results in a nutshell

1. Storage of raw material, semi finished products
2. Proper handling of materials
3. Exhaust system, dust collection
4. Compressed air
5. Painting
6. Lighting
7. Waste management
8. Workers care
9. Building insulation/Heating systems

1 Storage of materials

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Good storage example:

- vertical storage
- sorted

1 Storage of materials

Excellent storage example:

- Boards are labeled and are in inventory

1 Storage of materials

Proper Storage raw material and tools

2 Proper handling of materials

What do you observe?

2 Proper handling of materials

3 Exhaust systems & dust collection

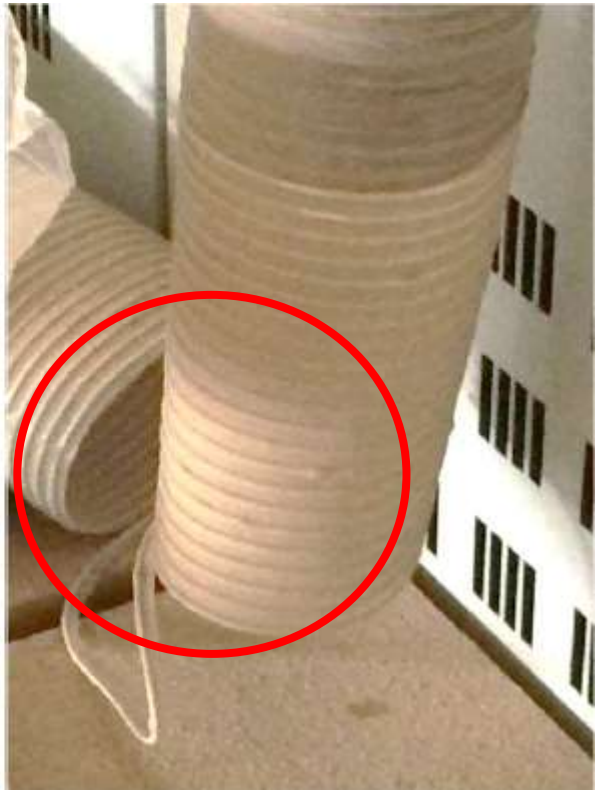
Dust – one of the major problems:

- Product quality
- Productivity
- Lamps & Lighting
- Health & Safety
- Motor clogging

3 Exhaust systems & dust collection

Reasons:

- open ducts, broken ducts
- leaks in dust bags



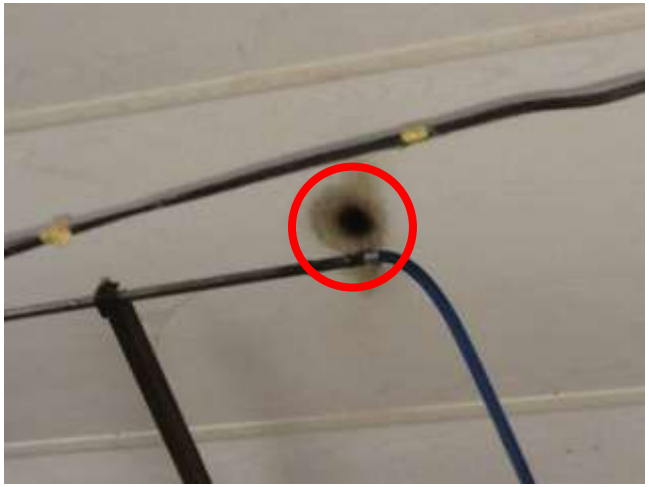
3 Exhaust systems & dust collection

Reasons:

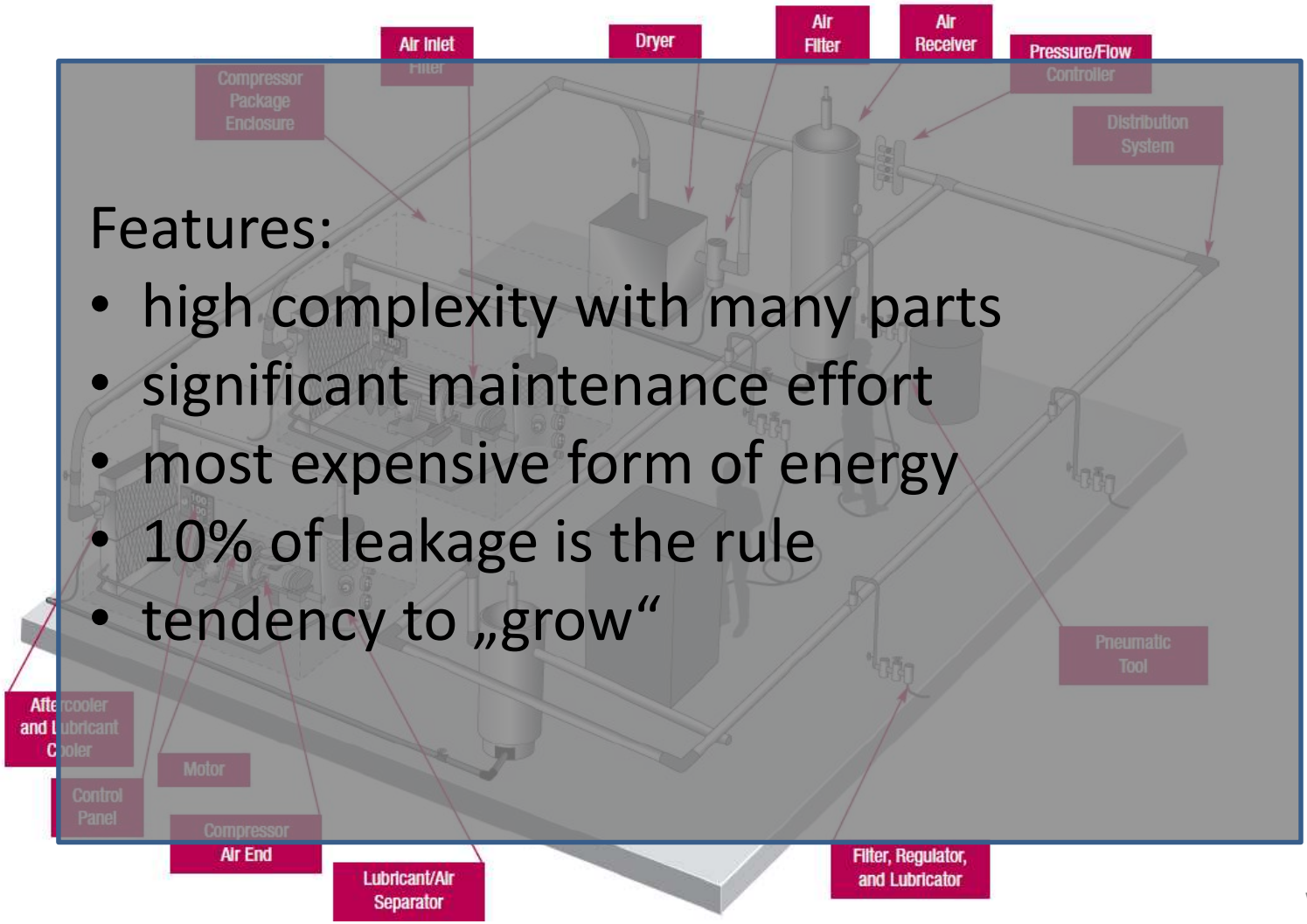
- missing devices to close ducts (blast gates)
- open blast gates (lack of worker training)

4 Compressed Air

„Global issue“: maintenance, insufficient layout are main problems



4 Compressed Air



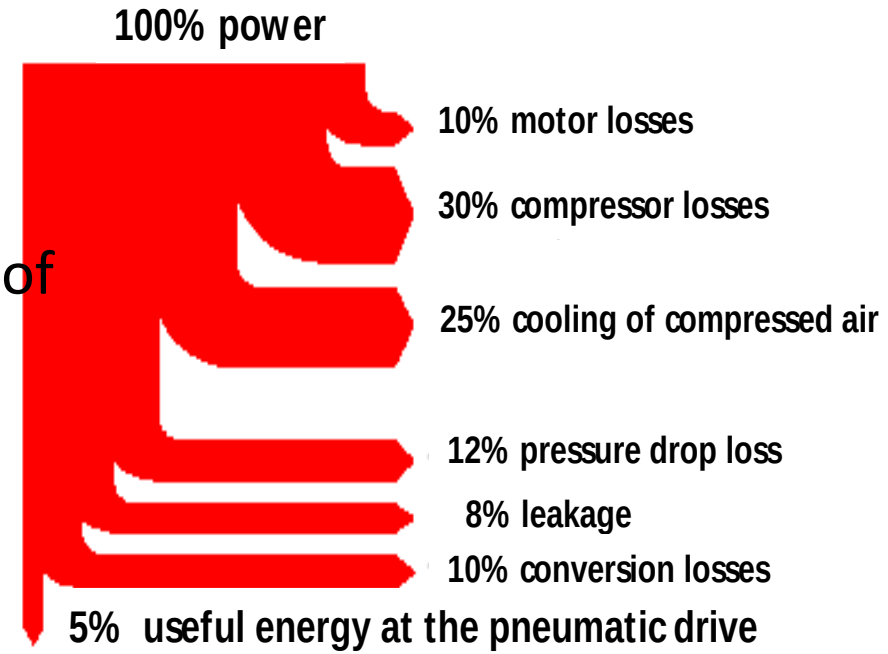
Features:

- high complexity with many parts
- significant maintenance effort
- most expensive form of energy
- 10% of leakage is the rule
- tendency to „grow“

4 Compressed Air

Main facts & recommendations

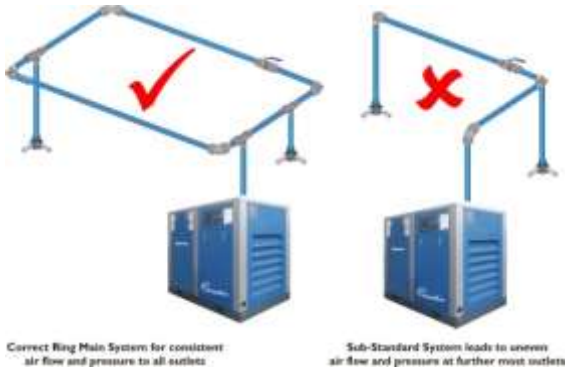
- overall efficiency compression approx. 5%
- Investment costs approx. 20-30% of total cost
- Pay attention to the compressor room:
  - Temperature between +5°C and 40°C
  - Intake air at compressor cool and clean
  - Maintain the air filters regularly



4 Compressed Air

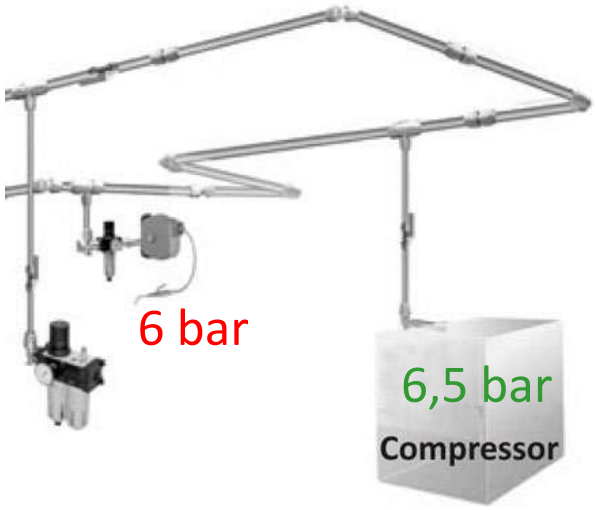
Main recommendations

- Install a ring system



- Keep pipeline length to a minimum
  - reduce number of consumers
  - avoid too many branches
  - replace with electrical tools if possible

- Pressure differcence between compressor – consumer: 0.5 bar (optimal system)
- +1 bar = +6% electricitiy



4 Compressed Air

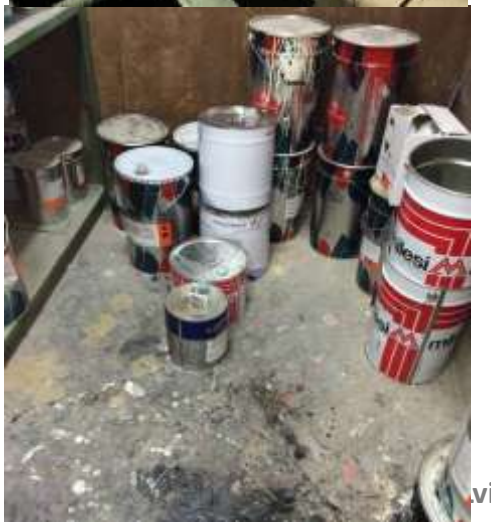
Costs of air leaks:

- 1 mm = 0,9 €/day = 317 € /year
- 3 mm = 8,7 €/day = 3.145 € / year
- 5 mm = 23,3 €/day = 8.515 € / year
- 10 mm = 93 €/day = 33.900 € / year

* based on electricity price of 0,09 €/ kWh
* running 24/7, 365 days

5 Painting

- Storage of Chemicals must be in a separate room
- Avoid open containers



5 Painting

Painting in 2 different ways

→ Regular training of workers required
→ Pay attention to the right spray technology

6 Lighting

Common issues: No reflectors , damaged lamps are not removed (maintenance)

6 Lighting

Common issues: Insufficient lighting for work activity

6 Lighting

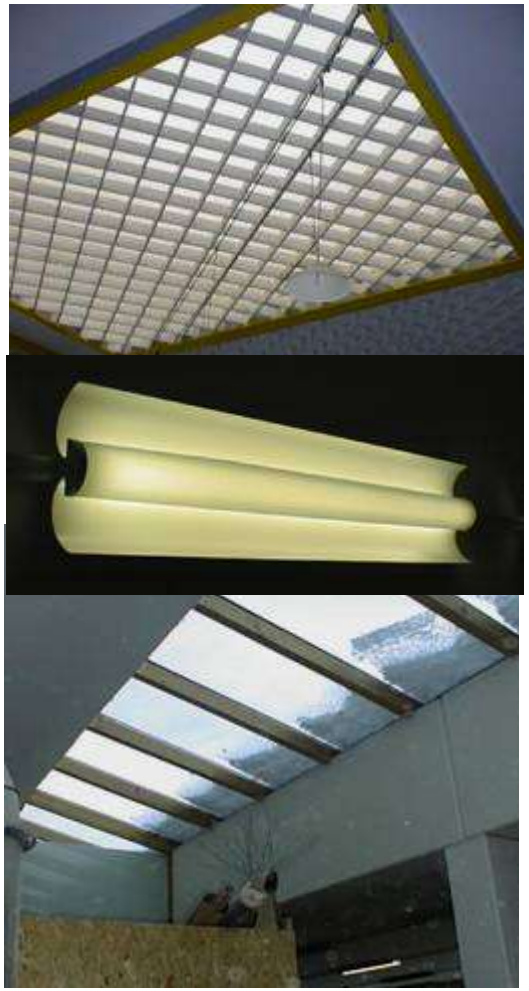
Recommended light level in different work spaces (impact von product quality, productivity and safety)

Activity	Illumination *(lux, lumen/m²)*
Public areas with dark surroundings	20 - 50
Simple orientation for short visits	50 - 100
Working areas where visual tasks are only occasionally performed	100 - 150
Warehouses, Homes, Theaters, Archives	150
Easy Office Work, Classes	250
Normal Office Work, PC Work, Study Library, Groceries, Show Rooms, Laboratories	500
Supermarkets, Mechanical Workshops, Office Landscapes	750
Normal Drawing Work, Detailed Mechanical Workshops, Operation Theatres	1,000
Detailed Drawing Work, Very Detailed Mechanical Works	1500 - 2000
Performance of visual tasks of low contrast and very small size for prolonged periods of time	2000 - 5000
Performance of very prolonged and exacting visual tasks	5000 - 10000
Performance of very special visual tasks of extremely low contrast and small size	10000 - 20000

6 Lighting

Numerous improvement options

- Use day light whenever possible (e.g. roof windows)
- Lights close to window areas shall be switched independently of the others
- Clean windows and lamps/bulbs regularly
- Use reflectors
- Use energy efficient bulbs (preferably LED), short payback time when used 8-10h/day
- Use time or motion sensor, dimmer, daylight control, etc.
- Turn off light when not needed



7 Waste management

- closely connected to legal requirements
- lack of waste separation
- upcoming issue

7 Waste management

Good practice from Central Europe

- high legal requirements
- waste as a business

8 Workers care (safety & health)

Company + Workers safety, Risk management

8 Workers care (safety & health)

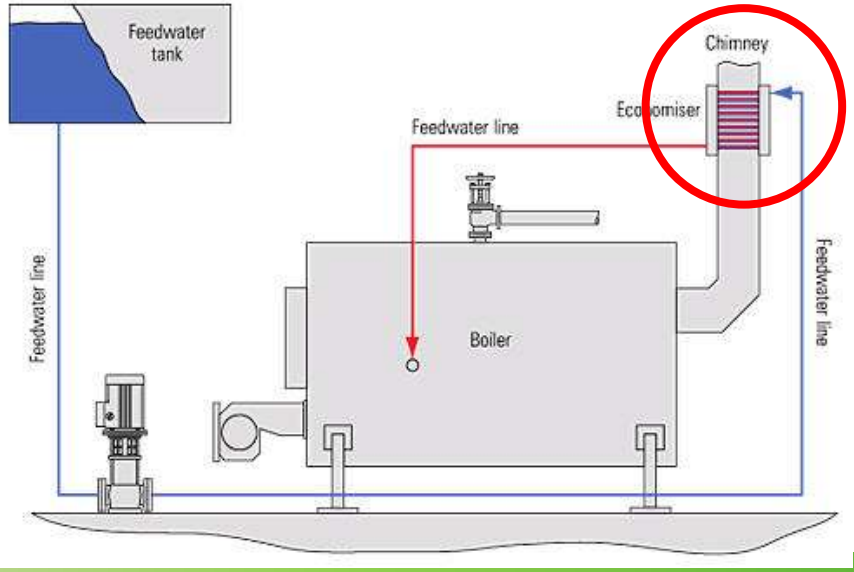
Health & safety protection

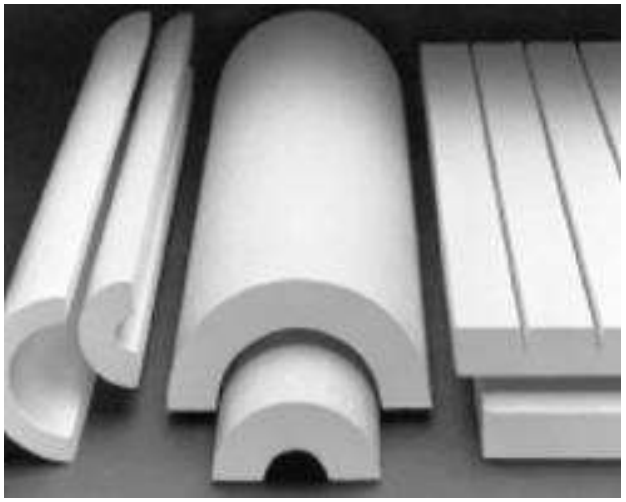
- another „global“ issue
- cooperation of workers required
- awareness training


9 Heating system/ Building insulation

- Outdated Boiler systems
- Insufficient maintenance
- Missing insulation
- Missing heat recovery

Stack economizer for heat recovery (approx. 5% of boiler input capacity can be saved)





ALL hot surfaces must be insulated:

- Water pipes
- Boilers
- Valves, fittings and controls where possible

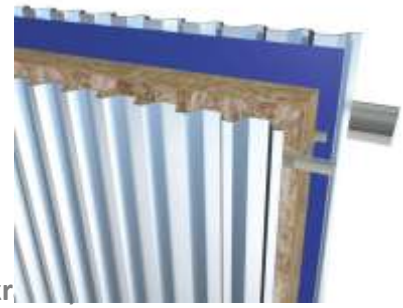
9 Heating system/ Building insulation

Major issue: old factories reused for production, but improvements are possible

9 Heating system/ Building insulation

Options for improvement:

1. Insulate roof or uppermost floor first
   ➔ payback quite reasonable (30-35%)
2. Install or improve sealings of doors and windows, close holes (21%-31%)
3. Insulate walls (18-25%)
4. Use of plastic curtains



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Thank you for your attention!