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Exposure to solar UV radiation – a special view on apron workers

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What will be presented?

- How is the effect of solar UV radiation?
- How and what was determined?
- Results
- Conclusions

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Sunlight and UV radiation

Sunlight mostly consists of the visual spectrum followed by infrared radiation and a small ratio of UV radiation (ca. 6%).

UV range	Wavelength	UV transmittance of the atmosphere
UV-A	320 - 400 nm	reachs almost completely the surface of the earth
UV-B	280 - 320 nm	approximately 90% will be absorbed by ozone
UV-C	200 - 280 nm	almost completely absorbed in the atmosphere

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How is the effect of UV radiation?

beneficial effect:	formation of vitamin D, which is necessary for osteogenesis
acute damage:	keratitis and conjunctivitis
	sunburn
chronic damage:	cataract
	early skin ageing
	skin cancer (actinic ceratosis, squamous epithelial carcinoma, basalioma)

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Exposure to solar UV radiation as occupational disease?!

- Observation: preferential appearance of actinic ceratosis, squamous epithelial carcinoma and basalioma by employees in Germany, who work regularly outdoors
- Since 2015 actinic ceratosis and squamous epithelial carcinoma caused by solar UV radiation is recognised as an occupational disease by the German social accident insurance.
- Reliable data of the impact of solar UV radiation on specific occupational groups do not exist.

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What does GENESIS-UV mean?

- research project „skin cancer caused by solar UV radiation“
- conducted by the Institute for Occupational Safety and Health of the German social accident insurance (IFA)
- long-term measurements at different workplaces
- measuring with a personal terminal equipment per working day; transfer of the data to a central data base via encoded mobile communications

Research project

- measuring of UV exposure of different tasks performed outdoors by using an electronic dosimeter
- measuring per working day from April till end of October 2015
- recording of data every second
- measuring of: UV-A and UV-B radiation
  date and time
  temperature
  geographical orientation of the sensors
  motion sensor
- **no** recording of GPS data

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How will solar UV radiation be determined?

- determination of the erythemal radiation (quanitification of the dosis of UV radiation, that causes an erythema)
- erythemal radiation is defined as standard erythema dose (SED; 1 SED = 100 J/m²)

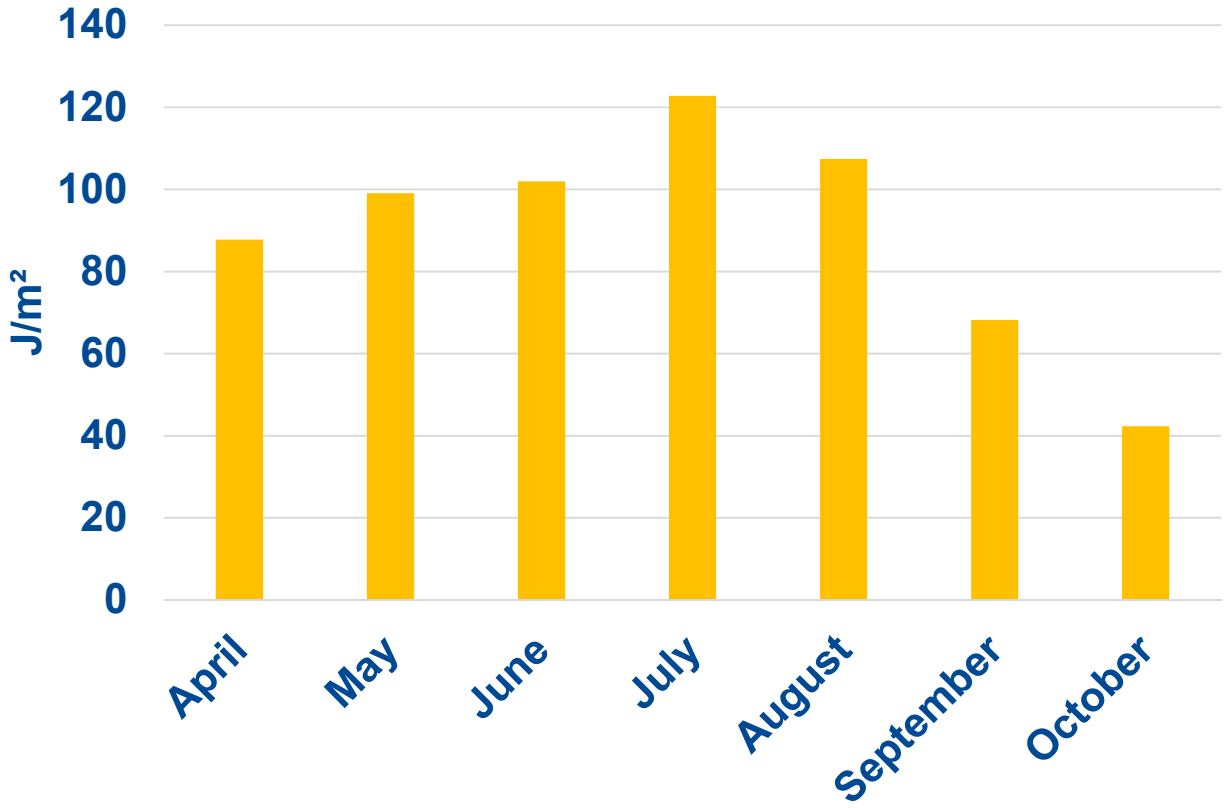
Research project

- In 2015, 18 apron workers were equipped with a dosimeter and a data logger.
- Considering the shift work, the systems daily record data between 6 am and 6 pm.
- Twice a week, data were read out and transferred to a central database server.
- Data were interpreted anonymously and only the task studies were considered.

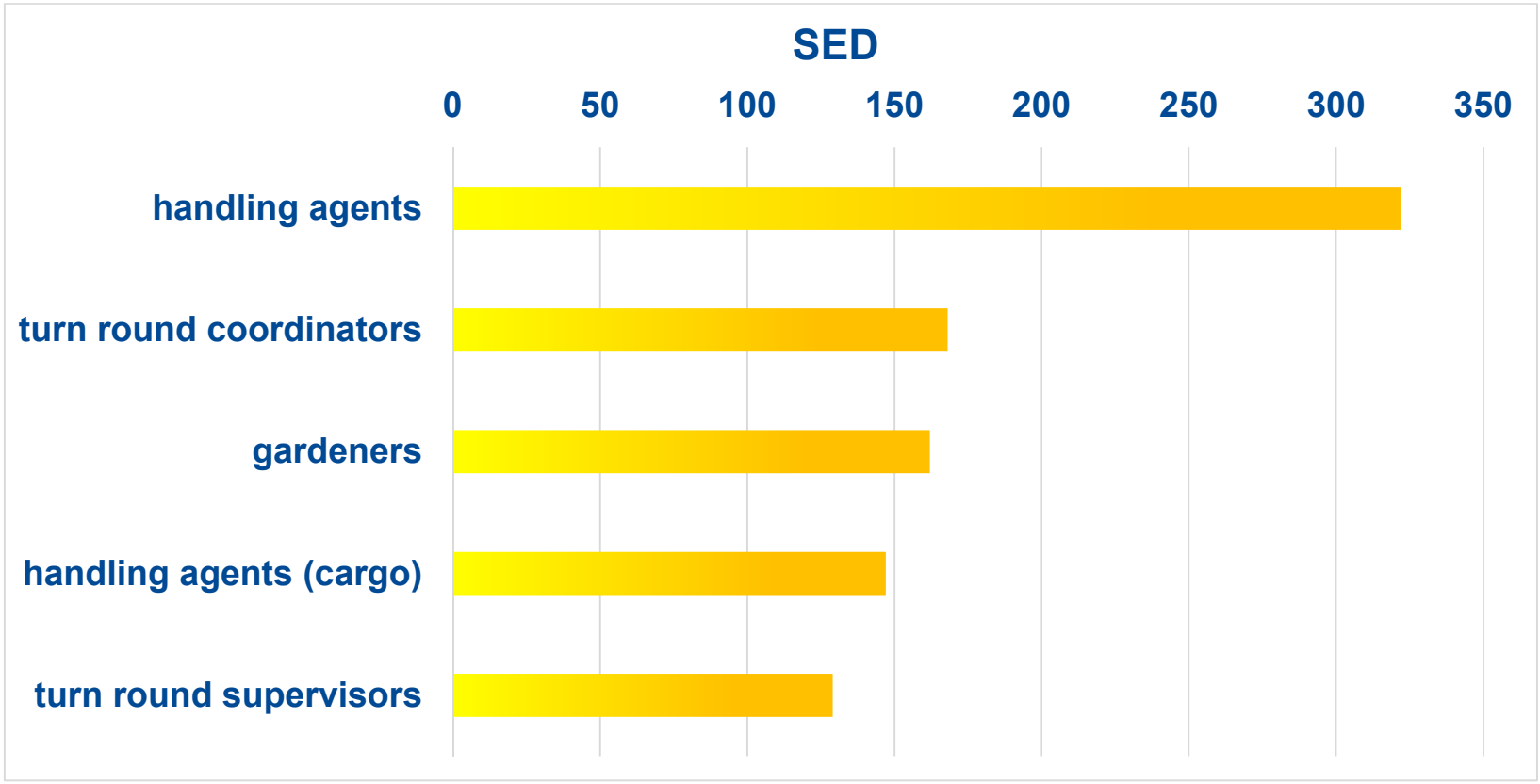
Apron workers

- Handling agents (passengers)
- Handling agents (cargo)
- Turn round coordinators (TRC)
- Turn round supervisors
- Gardeners

Daily mean value of handling agents (cargo)



Apron workers (annual solar UV exposure)



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Comparison between different operations at transport services

Transport | UV radiation exposure

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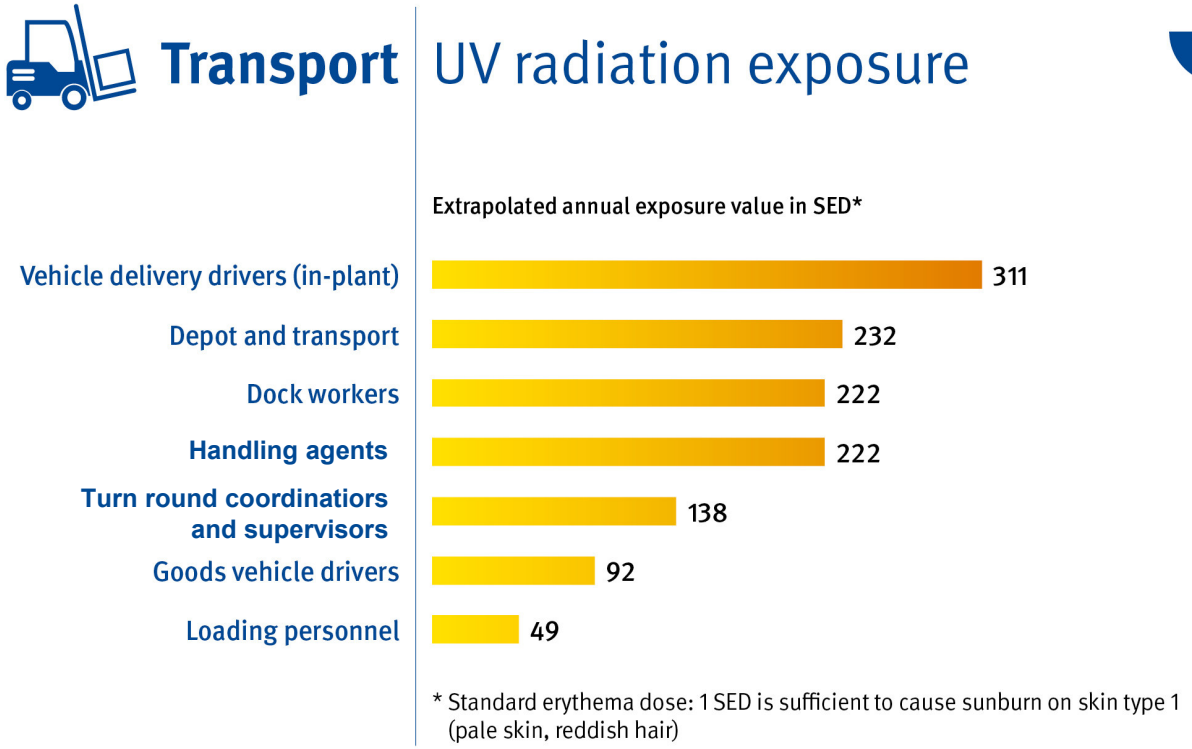

* Standard erythema dose: 1 SED is sufficient to cause sunburn on skin type 1 (pale skin, reddish hair)

Source: www.dguv.de

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Which operations have the highest impact on solar UV radiation?

Occupations with the highest exposure

UV radiation exposure

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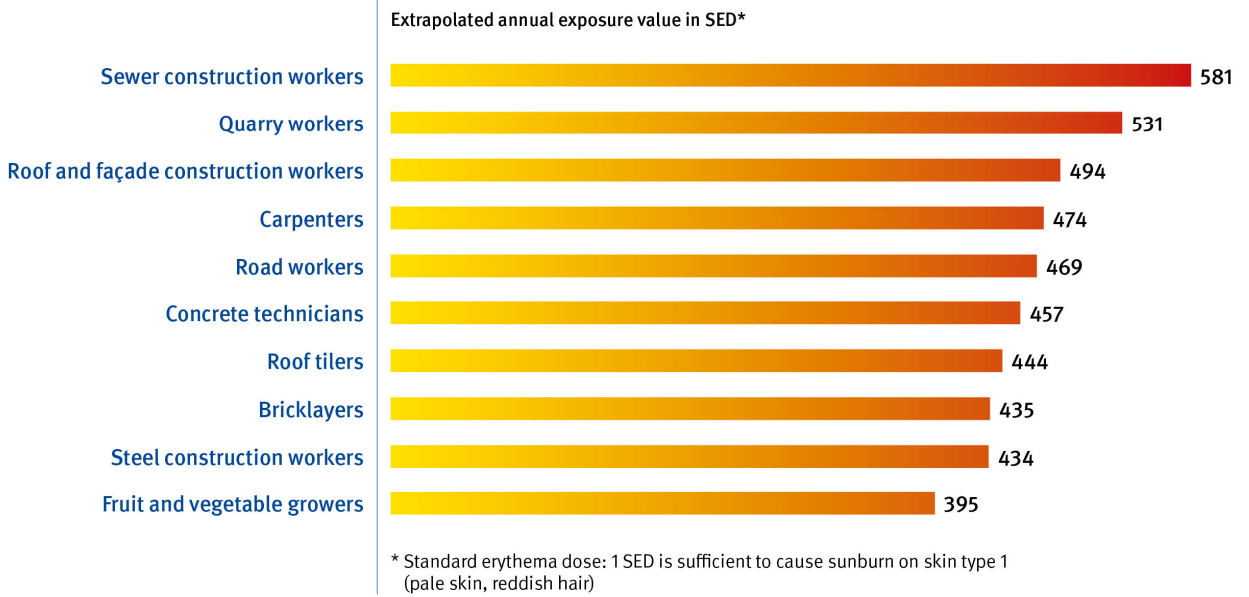

* Standard erythema dose: 1 SED is sufficient to cause sunburn on skin type 1 (pale skin, reddish hair)

Source: www.dguv.de

Conclusions

- Compared to other occupational groups, apron workers are exposed to a medium level of solar UV radiation.
- Among the apron workers, the handling agents (passengers) get the highest exposure of solar UV radiation.
- Preventive measures are necessary during work at the apron.