



International Committee of Occupational Health Scientific Committee on Thermal Factors (SCTF)

1st Meeting Report (2022-2024)

Time: Thursday, 23 June 2022, 6:30 a.m. – 8:00 a.m. GMT

Venue: Virtual Meeting on Zoom

Participants: Annex I

1. Welcome and Introduction

1.1 Jason Lee welcomed the attendees and reminded members about the possible dangers of the approaching summer in some parts of the world.

1.2 Jason gave time for a new member, Dung Phung, to introduce himself briefly.

1.3 Jason reminded the members about the aim of SCTF, and that SCTF not only focuses on workers working in the heat but also those working in the cold. Jason continued to highlight that collaborations between SCTF members should continue, citing the recent statement on the heat issue in Qatar as an example.

1.4 The meeting agenda was as follows:

1.4.1 Presentation by PK Latha on *“Heat and Productivity Impacts on Outdoor Workers - A Case Study from South Indian Workplaces”*.

1.4.2 Presentation by Sirkka Rissanen on *“Mining Industry and Respirators in the Arctic”*.

1.4.3 Presentation by Ross Di Corleto on *“Heat Stress in Vehicles”*.

2. PK Latha: *“Heat and Productivity Impacts on Outdoor Workers - A Case Study from South Indian Workplaces”*.

2.1 [Link to presenter’s deck](#)

2.2 PK Latha shared about her study which investigated heat stress exposure, physiological impacts, and heat-related productivity loss among South Indian workers, as well as possible interventions specific to the context of India.

2.3 PK concluded that outdoor workers who are exposed to heat suffered from productivity loss. She added that while future research should look into wage loss by workers for the implementation of appropriate preventive measures, there were challenges faced by the research team that has prevented them from doing so.

2.4 Discussions:

2.4.1 Elpseth Oppermann expressed her interest about the recommendation of cooling foods for workers and asked if PK could elaborate more. Elpseth shared about her experiences with migrant workers from Tamil Nadu working

in Singapore, stating that they might have an imbalanced diet as they only ate cooling fruits and vegetable when feeling hot.

2.4.1.1 PK replied that while this recommendation has not been implemented, her research team has gathered information about the workers' knowledge on the nutrition of their diet. PK also emphasised the importance of first raising awareness about the nutritional values of certain diets using research evidence, before compliance from workers can be achieved.

2.4.2 Bruno Lemke asked how productivity loss was measured and what was it in relation to.

2.4.2.1 PK replied that productivity loss was measured subjectively based on how workers felt they performed under a particular ambient temperature.

2.4.2.2 Tord Kjellstorm questioned the measurement of productivity loss using subjective questionnaires.

2.4.2.3 PK replied that apart from productivity loss questions, the workers were also asked other questions relating to the amount of sick leave taken and wage lost experienced.

2.4.2.4 Tord highlighted that while these questions are important, it could be useful to collaborate with industries to compare productivity loss in the form of output per working hours between hot and cool season. He added that this should also be done for indoor workers.

2.4.3 Jason Lee commented about the applicability of using Threshold Limit Values (TLV) on acclimatised workers. Jason questioned whether current TLV values might be too conservative for acclimatised workers, though concurrently, the evidence from PK's study seem to suggest otherwise as 91% of the workers experienced heat strain symptoms.

2.4.4 Jason Lee also observed that there are more dehydrated individuals based on urine specific gravity (USG) during winter.

2.4.4.1 PK replied that this was due to a greater percentage of workers profiled during winter.

2.4.4.2 Jason highlighted the fact that using USG to determine hydration status is less accurate immediately after an exercise, as compared to before an exercise, due to acute hormonal changes that can improve fluid retention. Jason also speculated that another reason for the greater percentage of dehydrated individuals could be due to workers feeling cooler during winter and therefore, workers might not feel the need to hydrate themselves as regularly.

Afternote: Tord Kjellstrom commented SCTF can work together on a report on the gaps in evidence for improved protection of workers currently and in future, and for improved climate change impact assessments.

3. Sirkka Rissanen: “Mining Industry and Respirators in the Arctic”.

3.1 [Link to presenter’s deck](#)

3.2 Sirkka Rissanen shared about MineHealth, which is a research collaboration to sustain miners’ well-being, health and work ability across Finland, Sweden, Norway, and Russia.

3.3 Sirkka presented a research study involving the mining industry and the use of respirators. She concluded that powered air-purifying respirators can cause severe facial cooling and its use is limited due to discomfort experienced. Therefore, additional face protection is a solution to reduce this discomfort.

3.4 Sirkka ended the presentation by introducing the facilities and equipment available in the Laboratory of Thermal and Clothing Physiology in the Finnish Institute of Occupational Health.

3.5 Discussion:

3.5.1 Jason Lee asked if there is a known skin temperature for optimal comfort at the face.

3.5.1.1 Sirkka responded that the optimal skin temperature for optimal comfort at the face is 34°C while resting and 31°C while at work. She elaborated that further studies planned to investigate the amount of heating or cooling

needed at different ambient temperatures while wearing respirators to ensure comfort.

3.5.1.2 Jason asked if heat is a problem in Finland when mining during summer.

3.5.1.3 Sirkka replied that heat can affect the miners too and temperatures of about 30°C can be expected in the coming weeks.

3.5.1.4 Jason commented that information gathered from research done on the miners can be useful as more underground works are expected in other parts of the world like Singapore.

Afternote: Tord Kjellstrom commented SCTF can work together on a project on occupation health threats from cold snaps and continuous cold periods.

4. Break

5. Ross Di Corleto: “Heat Stress in Vehicles”.

5.1 [Link to presenter’s deck](#)

5.2 Ross Di Corleto presented about a project which investigated the simple risk assessment process for heat exposure for courier drivers.

5.3 Ross emphasised that a simple checklist to highlight areas of impact is important for drivers to assess pre-task risk. He added that although the study was conducted in the USA, the risk is higher in other parts of the world. Moreover, there could be other contributing factors of heat stress for courier drivers, such as weight of parcel and distances covered while carrying parcel, should be considered.

5.4 Ross shared the case of OSHA v.s. Postal Service in 2020, where OSHA failed in prosecuting Postal Service for five heat stress incidents due to a lack of evidence presented to establish the scientific basis for the risk categories of the National Weather Service heat index.

5.5 Discussions:

5.5.1 Dung Phung asked if Ross has had the opportunity to speak with the industry to validate the risk assessment tool.

- 5.5.1.1 Ross explained that discussions with the collaborating company about using physiological monitoring has begun, but travel issues due to COVID-19 and legal issues has made it difficult.
- 5.5.1.2 Dung expressed his interest to collaborate in similar validation studies if the opportunity arises in future.
- 5.5.2 Matthias Otto commented that some vans do not have separation between the cabin and the freight rooms which explained the lack of air-conditioning in these vans as air-conditioning would be inefficient. Matthias suggested that it can be worthwhile to quantitatively investigate the effects of heat stress on productivity of courier drivers.
- 5.5.2.1 Ross agreed with Matthias' suggestion, but mentioned that it is challenging to acquire these quantitative data from the company.
- 5.5.2.2 Matthias agreed with Ross. Matthias proceeded to ask if the temperature and relative humidity of the environment inside or outside the vehicle was used during the prosecution.
- 5.5.2.3 Ross replied that he was unsure.
- 5.5.2.4 Matthias highlighted that the environment within the vehicle can also be relevant in this case.
- 5.5.2.5 Ross explained that the courier drivers were moving in and out of their vehicles quite a bit. He would also try to gather more information from the transcripts of the five cases.
- 5.5.3 Tord Kjellstrom reiterated how indoor environments can be hotter than outdoor environments, and suggested that SCTF members can collaborate to come up with evidence-based recommendations of preventive measures. Tord hoped that Ross' project can continue, and he extended his help, along with Bruno Lemke's and Matthias Otto's, if future climatic projections are needed.
- 5.5.3.1 Ross commented that the interest in the current project derived from the current heat stress index. Ross introduced another project that he is

involved in currently, which was motivated by a mining company looking at a new heat stress index, rather than using the current one. He mentioned that his team has already begun working on this new index that will be based on weather station data and predicted heat strain modelling.

5.5.3.2 Tord shared that it is important to develop a heat index that will be accepted globally, and the development of such an index can be a potential project for SCTF.

5.5.4 Jason Lee commented that he is intrigued by the significant difference in heat load among the different coloured vehicles. Jason added that as the courier industry is increasing in Singapore and other parts of Southeast Asia, the way the workers are paid is important in determining how hard they work.

5.5.5 Jason Lee reiterated Matthias' statement that there is scope to write guidelines on quantifying work productivity in various sectors so that in future, other researchers will also consider how work productivity can be measured.

5.5.6 Jason Lee emphasised that research on occupational heat stress is not merely an academic exercise as it has huge implications on human lives.

Afternote: Tord Kjellstrom commented SCTF can work together on a project on the heat problems for distribution businesses such as courier drivers, and a project to compare heat safety indices for a scientifically clearer interpretation of existing indices.

6. AOB

6.1 Jason Lee asked members to invite others who are suitable and relevant to SCTF to join the committee in order to increase the network.

6.2 Jason Lee shared about the upcoming 19th International Conference on Environmental Ergonomics held from 6 to 10 September 2022 in Niagara, Canada, and encouraged members to sign up if it is relevant to them.

6.3 Jason Lee shared about a bi-annual Heat on Human Health Symposium held from 15 to 16 September 2022 at the Simulation Center for Military Medicine,

Phramongkutklao College of Medicine in Bangkok, Thailand. Participation is either in-person or online via Zoom.

Meeting minutes were recorded by Clarence Leow, endorsed by Sirkka Risannen (Secretary) and approved by Jason Lee (Chair).

Annex I – List of Attendees

Jason Lee (Chair), National University of Singapore, Singapore

Sirkka Rissanen (Secretary), Finnish Institute of Occupational Health, Finland

Tord Kjellstrom (Advisor), Health and Environmental International Trust, New Zealand

Bruno Lemke, Health and Environmental International Trust, New Zealand

Clarence Leow, National University of Singapore, Singapore

Dung Phung, University of Queensland, Australia

Elsbeth Oppermaun, Ludwig-Maximilian University of Munich, Germany

Hilde Færevik, SINTEF Digital, Norway

Hsiao Yu Yang, National Taiwan University, Taiwan

Jenni Kaisto, Finnish Institute of Occupational Health, Finland

Matthias Otto, Nelson Marlborough Institute of Technology, New Zealand

PK Latha, Sri Ramachandra Institute of Higher Education and Research, India

Rekha Shanmugam, Sri Ramachandra Institute of Higher Education and Research,
India

Ross Di Corleto, Monitor Consulting Services, Australia

Satoru Ueno, National Institute of Occupational Safety and Health, Japan

Seichi Horie, University of Occupational and Environmental Health, Japan

Wenjia Cai, Tsinghua University, China

Efi Yuliati Yovi, IPB University, Indonesia

Screenshot of participants in meeting on Zoom:

