ANNEXURE I

SRI RAMACHANDRA UNIVERSITY

INSTITUTIONAL ETHICS COMMITTEE
(Other than Clinical Evaluation of Drugs/ Procedures/ Devices/ Diagnostics/ Vaccines/ Herbal Remedies)

Chairperson: Dr. A. Nalini
Member Secretary: Dr. Pankaj B. Shah
Members:
Dr. Padmanavathi R.
Dr. Nirupa
Dr. C.D. Narayanan
Dr. T.S. Lokeswari
Dr. K. Punnagai
Dr. Leena Dennis Joseph
Dr. Porkodi

Dr. L.V.K.S. Bhaskar
Dr. Vamsi Lavu
Mr. S. Rethina Kumar
Mrs. Sheeba Vinod
Mrs. Girija Kumar Babu
Mrs. Sudha Ganapathy

To: Dr. Krishnan
1st Yr. PG Student
Dept. of Physiology
SRMC, SRU.

24.11.2012

Dear Sir,

REF: IEC-NI/12/OCT/30/54

Thank you for submitting the clarifications. The Institutional Ethics Committee approves the project.

You are advised to be familiar with ICMR guidelines on Biomedical Research in human beings and also to adhere to the Principles of good clinical practice. You are required to submit the final report after the completion of study to the Institutional Ethics Committee.

Yours Sincerely,

(DR. PANKAJ B. SHAH)

Note: Please quote IEC Reference number in all future communications.
ANNEXURE II
INFORMED CONSENT

Principal Investigator:

Dr. Krishnan
I year Post graduate student
Department of Physiology
Sri Ramachandra University
Porur, Chennai-600 116
Phone: +91 44 24765512 ext: 278
Fax: +91 44 2476 7008
Mobile: +91 9791213830
Email: drkrish10@gmail.com

DESCRIPTION OF THE STUDY:

People working in hot environments are susceptible to heat related health ailments such as heat exhaustion, heat stroke, and increased risk of injuries at workplaces. This study proposes to include environmental heat stress measurements and measurements of physiological heat strain assessment, including body temperature gradient of skin surface and deep body, sweating response, heart rate, and blood pressure measurements etc. Oxygen saturation, Pulse rate, Perfusion Index, Total Hemoglobin will be assessed non-invasively using Pulse Oximetry (Masimo Radical -7). All these test are non-invasive in nature. The time required to perform the test may vary from half an hour to one hour.

POSSIBLE RISKS TO THE PARTICIPANT:

There are no anticipated risks expected out of this study as all the test used are non-invasive. However a slight discomfort may be experienced while measuring core body temperature. It will take half an hour to one hour to undergo the tests.
POSSIBLE BENEFITS TO THE PARTICIPANT:
1. The volunteers will have a better understanding of their health status and their susceptibility to heat stress.
2. The volunteers will be educated about the effects of heat stress & ways to minimize them and also counseled to seek medical advice in case of complications.
3. Any loss of wages for the participated time will be compensated.

COST AND PAYMENTS TO THE PARTICIPANT:
There is no cost for participation in this study. Participation is completely voluntary and no payment will be provided. Loss of wages due to participation in this study will be compensated.

CONFIDENTIALITY:
Information obtained in this study is strictly confidential. Your name will not be used in reporting of information in publications or conference presentations.

PARTICIPANT’S RIGHT TO WITHDRAW FROM THE STUDY:
You have the right to refuse to participate in this study, the right to withdraw from the study and the right to have your data destroyed at any point during or after the study, without penalty.

VOLUNTARY CONSENT BY THE PARTICIPANT:
Participation in this study is completely voluntary, and your consent is required before you can participate in this study.

I have read this consent form (or it has been read to me) and I fully understand the contents of this document and voluntarily consent to participate in the study. All of my questions concerning this study have been answered. If I have any questions in the future about this study they will be answered by the investigator listed above. I understand that this consent ends at the conclusion of this study.
By signing this form, I agree to participate in this study. A copy of this form has been given to me.

Date:
Participant’s Signature/Thumb impression

Witness signature/Thumb impression

Name: Name

CERTIFICATION OF INFORMED CONSENT

I certify that I have explained the nature and purpose of this study to the above named individual, and I have discussed the potential benefits of this study participation. The questions the individual had about this study have been answered, and we will always be available to address future questions as they arise.

Date: Signature of person obtaining consent

Name: Affiliation
ANNEXURE III
QUESTIONNAIRE

A. Part 1. General information about person interviewed and the organization she/he represents
1. ID No:
2. Date of interview:
3. Name of the interviewer:
4. Type of the industry
5. Age:
6. Sex: □ 1 Male / □ 2 Female
7. Education: □ 1 Illiterate / □ 2 Primary / □ 3 Secondary / □ 4 Higher Secondary / □ 5 University
8. Designation:
9. Smoking: □ 1 Smoker / □ 2 Non Smoker / □ 3 Ex smoker
10. Consuming alcohol: □ 1 Yes □ 2 No □ 3 Ex
11. Any known illness: □ 1 Diabetes □ 2 Hypertension □ 3 Respiratory illness, specify □ 4 Others, specify

Part 2. Questions concerning the type of work
1. How long you are employed here? ____________years/months
2. How many employees work in this work area? ______________
3. How many hours per day do you usually work excluding regular break timings?
4. Do you work at the workers area? □ 1 Yes / □ 2 No
5. If No, you visit the workers area and how long you stay there ______________
6. Do you feel that increase in temperatures in work area is a problem to workers?
   □ 1 Yes / □ 2 No

Part 3. Questions in relation to heat exposure at work
1. Do workers inform you that hot season is a problem to work? □ 1 Yes / □ 2 No
2. Do you feel heat exposure during hot season affect the workers ability to work? □ 1 Yes / □ 2 No

Ph.D Thesis Entitled "Assessment of Heat Stress and its Impacts on Health of Workers from Different Occupational Sectors"
3. Do you feel that workers don’t complete their job in time due to hot weather season?

4. During how many months the workers complain that it is very hot in work place?
   a. 1-3 months       b. 4-6 months       c. 7-9 months       d. 9-12 months       e. Never

5. Describe how bad the heat stress can be in the hot season.

Part 4. Questions concerning impacts of heat on health

1. What are the symptoms that workers complain during summer months?
   a. Unbearably hot       b. Excessive Sweating       c. Exhaustion       d. Thirst       e. Wanting to go to comfort zone
   f. Others________________

2. What are the common complaints by workers during hot season??
   a. heavy sweating □ 1Yes / □ 2No
   b. muscle cramps □ 1Yes / □ 2No
   c. Tiredness/weakness □ 1Yes / □ 2No
   d. dizziness □ 1Yes / □ 2No
   e. headache □ 1Yes / □ 2No
   f. nausea or vomiting □ 1Yes / □ 2No
   g. fainting □ 1Yes / □ 2No

3. Have you ever been affected by any of the following?

Part 5. Questions concerning impacts of heat on worker’s productivity

1. Do you feel that heat affects the workers in your place in any of the following way
   a. Absenteeism       b. Loss of productivity
c. Irritation/Interpersonal issues
d. Work related issues with manager
e. Taking more time to complete same task
f. Frequently visiting comfort area by stating some reason

2. Do you receive more leave request during hot season? Yes/No
3. Do you feel that workers take more rest during the hot season?
   □ 1 Yes / □ 2 No
4. Do workers delay in completing their targets during the hot season? Yes/No
5. Have you ever sent any worker to go home after complaining sickness due to heat exhaustion? □ 1 Yes / □ 2 No
   If yes, how many hours in a week..........................
6. How many workers have been admitted in hospital due to heat related illness?
   How long have they been admitted (on average and maximum if possible)?
   How do you estimate productivity losses in workers
      1. Absenteeism/sickness
      2. Fatigue/rest
      3. Hydration/welfare
      4. Train more people due to high turnover
      5. Others ............................................................

Part 6. Questions concerning impacts of clothing in hot work atmosphere

1. Dress material of the workers:
2. Do workers wear the issued dress all the time?
3. Have they complained about the dress material any time?
4. Do they feel comfortable after removing the dress while doing work?
5. Do you feel that the uniform provided to workers is comfortable to them during hot weather □ 1 Yes / □ 2 No
6. If No, by what measure that the uniform could be made better during heat stress period for the employees?
Part 7. Questions concerning coping mechanisms:

1. What do you advice to worker if complains about heat stress?
2. Is sufficient water is provided at work duration? Yes / No
3. Is the water cooled and provided during hot weather season?
4. Do you have enough bathing facility and showers in your work place?
5. If yes how many bath rooms are available for workers to take bath?
ANNEXURE IV
DATA COLLECTION FORM – ENVIRONMENT

**STUDY ID:**

**NAME:**

**PLACE OF MEASUREMENT:**

**TIME OF MEASUREMENT:**

**LOCATION OF INDUSTRY:**

**SEASON:**

**TYPE OF INDUSTRY:**

<table>
<thead>
<tr>
<th>SL.NO</th>
<th>PARAMETERS</th>
<th>READINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Wet bulb temperature (deg. Celsius)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Dry bulb temperature (deg. Celsius)</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Relative humidity (%)</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Dew Point (deg. Celsius)</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Final WBGT level (deg. Celsius)</td>
<td></td>
</tr>
</tbody>
</table>

**DATA COLLECTION FORM – HEALTH PARAMETERS**

**STUDY ID:**

**NAME:**

**TYPE OF INDUSTRY:**

**LOCATION OF INDUSTRY:**

**TIME OF MEASUREMENT:**

**SEASON:**

<table>
<thead>
<tr>
<th>SL.NO</th>
<th>PARAMETERS</th>
<th>PRE WORK READINGS</th>
<th>POST WORK READINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Core Body temperature (Deg. Celsius)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Heart rate (beats/minute)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Perfusion Index</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Sweat rate (sweat loss / time, L/hour)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Urine specific gravity</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ANNEXURE V

LIST OF PUBLICATIONS


Ph.D Thesis Entitled "Assessment of Heat Stress and its Impacts on Health of Workers from Different Occupational Sectors"


Conference presentations

1. Oral presentation in PHYSICON 2012 - Assessment of health effects among construction workers exposed to occupational heat stress

2. Oral presentation in CITI INDIA 2013 - Parameters used for Heat strain assessment among workers - A Technical Scan

3. Oral presentation in OMICS Occupational health 2013- Perfusion index among workers exposed to heat stress – a pilot study


5. Oral presentation in CITI INDIA 2014 Effect of nutritional intervention among auto parts manufacturing workers exposed to Heat stress

7. Oral Presentation in ENVOCCON 2016 - Heat exposure and mapping in selected steel industry of Tamil Nadu using geographical information system (GIS)

Courses Attended:

1. Attended orientation program in research methodology and biostatistics at Sri Ramachandra University – May 2013

2. Attended course on climate change and its health impacts at Umea University, Sweden – June 2013

3. Attended certificate course on biostatistics conducted by Environmental Health engineering at Sri Ramachandra University – May 2014
ANNEXURE VI - FIELD PICTURES
Ph.D Thesis Entitled "Assessment of Heat Stress and its Impacts on Health of Workers from Different Occupational Sectors"