HEAT STRESS MANAGEMENT MANUAL
FOR INDIAN WORKSITES

Practical Implementation Guide for Employers and Safety Teams

Covering Construction | Manufacturing | Warehouses | Facility Management | Solar Projects

Developed based on international research, industry standards, and EHS field practices

Edition 2026 | For Indian Industrial Use

Sahasendure Solutions | info@sahasenduresolutions.com | 9599573037 | www.sahasendure.com

1. Executive Summary

India's workforce faces one of the most severe occupational heat challenges in the world. With over 500 million outdoor and semi-indoor workers exposed to extreme temperatures — often between 38°C and 48°C during peak summer — heat stress is no longer just a health concern. It is a business risk, a legal liability, and a threat to productivity.

Why Heat Stress Is a Rising Business Risk in India

- India recorded over 30,000 heat stroke deaths between 1992 and 2020, with numbers accelerating each decade.
- **Construction, manufacturing, warehousing, and solar installation** sectors regularly expose workers to dangerous conditions for 6–10 hours per day.
- Heat-related incidents lead to direct costs — hospitalisation, compensation claims, absenteeism — and indirect costs such as project delays and productivity loss.
- A worker operating in 42°C heat can lose up to 30% of their productive capacity. In physically demanding roles, cognitive impairment significantly increases accident risk.

Why Companies Must Act Before Peak Summer

- Heat illness is preventable. Most fatalities and serious incidents occur due to the absence of basic controls: water, rest, and shade.
- Companies that wait until an incident occurs face regulatory penalties, civil liability, and reputational damage.
- A properly implemented heat stress management programme costs a fraction of even one worker hospitalisation, compensation claim, or project shutdown.

> ⚠ **CRITICAL FACT**
> The International Labour Organization estimates nearly 23 million heat-related injuries and 19,000 fatalities occur globally each year due to occupational heat exposure. India accounts for a significant portion of this burden.

Business Impact Summary

Risk Area	Without Programme	With Programme
Worker Safety	High risk of heat stroke, fatalities	Up to 80% reduction in heat incidents
Productivity	20–30% loss during peak heat hours	Maintained output through work-rest cycles

Risk Area	Without Programme	With Programme
Legal Liability	Penalties under Factories Act / OSH Code	Compliance documentation protects employer
Absenteeism	Frequent sick days during summer months	Reduced illness through early intervention
Project Timelines	Delays due to incapacitation of workers	Planned schedules maintained

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2. Understanding Occupational Heat Stress

Many workplace incidents are preventable when supervisors and workers understand the difference between heat stress and its clinical outcomes. This section explains these concepts in plain language.

The Three Levels of Heat Impact

Condition	What It Means	Action Required
Heat Stress	The total thermal load on the body — from sun, humidity, physical exertion, and clothing. Not yet dangerous but must be monitored.	Monitor conditions, apply controls — rest, water, shade.
Heat Exhaustion	The body is struggling to regulate temperature. The worker feels weak, dizzy, nauseous, and sweats heavily. Core body temperature is elevated but below 40°C.	STOP WORK immediately. Move to a shade /cool area. Give water and ORS. Rest minimum 30 minutes. Monitor.
Heat Stroke	Medical emergency. Core temperature exceeds 40°C. The brain and organs are at risk. Workers may be confused, stop sweating, collapse, or lose consciousness.	Call an ambulance immediately. Begin cooling at once. Do NOT delay. This is life-threatening.

Why Indian Workers Are at Higher Risk

Indian workers face a combination of risk factors that makes occupational heat stress particularly dangerous:

- High ambient temperatures and humidity — particularly in coastal states (Maharashtra, Odisha, Andhra Pradesh, Tamil Nadu) and arid zones (Rajasthan, Gujarat).
- Limited acclimatisation — workers returning from leave or new joiners are highly vulnerable in the first 7–14 days.
- Poor nutrition and dehydration — workers who begin shifts without adequate food or water are more susceptible.
- Chronic health conditions — anaemia, diabetes, and hypertension (common in Indian workers) significantly increase heat illness risk.
- Heavy PPE — full-body protective equipment, safety helmets, and reflective jackets all reduce the body's ability to lose heat through sweating.
- Cultural reluctance — workers often hesitate to report discomfort due to fear of job loss or peer pressure, delaying intervention.

Outdoor vs. Indoor Heat Exposure

Outdoor Exposure	Indoor/Semi-Indoor Exposure
• Construction sites • Road works and excavation • Solar panel installation • Agricultural and landscaping work • Direct sunlight and radiant heat from surfaces	• Steel and foundry plants • Warehouses with corrugated metal roofing • Commercial kitchens and bakeries • Textile and garment factories • Heat from machinery, boilers, and process equipment

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3. Indian Industry Risk Scenarios

Heat stress does not happen the same way across all workplaces. Here are realistic scenarios from common Indian industries to help you identify risks in your own setting.

Scenario 1: Construction Site — High-Rise Building Project (Pune, Maharashtra)

A crew of 45 workers is engaged in concrete pouring and rebar installation on the 8th floor of a building. The time is 12:30 PM in May. The ambient temperature is 41°C. Workers have been on-site since 8 AM with no formal break schedule. There is no shade near the active work zone. Water containers are located at the ground level, requiring workers to climb down to access them.

What Goes Wrong

By 2 PM, three workers develop severe headaches and dizziness. One collapses with confusion and stops sweating — a heat stroke. The crew continues working while the supervisor calls for help. No on-site first aid protocol exists. The worker is taken to hospital 45 minutes after collapse. Severe organ stress results.

Scenario 2: Warehouse — E-Commerce Fulfilment Centre (Bhiwandi, Maharashtra)

A 40,000 sq. ft. warehouse with a GI sheet roof operates with 120 pickers and packers. Outside temperature is 43°C. Inside temperature near the roof level reaches 48–51°C due to radiant heat from the metal roof. Ceiling fans are present but insufficient. Workers are packing orders continuously for 6-hour shifts. There is no hydration plan and no work rotation.

What Goes Wrong

Eight workers report symptoms of heat exhaustion within two weeks during peak summer. Productivity drops by 35%. Three workers are absent for 5+ days. Management implements a cold-water station only after the third incident.

Scenario 3: Steel Manufacturing Plant (Raipur, Chhattisgarh)

Workers in the melt shop are exposed to radiant heat from furnaces at temperatures exceeding 60°C near the source. Shift duration is 8 hours. Workers wear full PPE including helmets and face shields. Acclimatisation periods for new workers are not practised. The canteen is 500 metres away from the work zone.

What Goes Wrong

A newly hired contract worker who joined two weeks ago experiences heat stroke during his second week. Investigation reveals he was assigned to the hottest area without a gradual acclimatisation plan. The incident triggers a regulatory inspection.

Scenario 4: Facility Management — Office Campus Maintenance (Hyderabad)

A team of 20 housekeeping and maintenance workers manages the outdoor areas of a 5-acre corporate campus. Workers start at 7 AM and work until 3 PM with a single 30-minute lunch break. In June, outdoor temperature peaks at 44°C between 11 AM and 2 PM. No shade structures are provided in the open areas where workers operate.

What Goes Wrong

Two workers show signs of severe heat exhaustion. One worker, an older employee with hypertension, faints and requires hospitalisation. The client company (the campus owner) receives a notice from the labour inspector.

Scenario 5: Solar Installation Project (Rajasthan)

A team of 30 workers installs solar panels on an open field in Jodhpur. Temperatures reach 46°C by 10 AM. The reflective panel surfaces increase the local radiant heat load. Workers wear dark-coloured uniforms. The project schedule requires work between 9 AM and 5 PM without consideration of heat.

What Goes Wrong

Multiple workers suffer from heat cramps and heat exhaustion by mid-morning. Project completion is delayed by 12 days due to workforce incapacitation. The contractor faces a penalty clause from the project developer.

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4. Legal & Compliance Perspective (India)

Indian employers carry both statutory and common-law obligations to protect workers from heat-related harm. Understanding this framework helps you prioritise action and reduces your exposure to liability.

The Factories Act, 1948

The Factories Act places direct responsibility on the occupier and manager of a factory to maintain a safe working environment. Key obligations include:

- Section 11 (Cleanliness and Environmental Management): Factories must maintain temperature conditions that do not threaten worker health.
- Section 13 (Ventilation and Temperature): Every factory must provide adequate ventilation and keep temperatures at reasonable levels, especially where heat-generating processes are involved.
- Section 14 & 15 (Dust, Fumes, Humidity): Employers must control excessive heat generated by humid processes or hot materials.
- The Inspector of Factories has the authority to investigate any factory following a heat illness incident. Non-compliance may lead to fines, suspension of operations, or prosecution.

Occupational Safety, Health and Working Conditions (OSH) Code, 2020

The OSH Code consolidates and modernises earlier labour laws and introduces stronger employer accountability:

- Employers must provide a safe working environment free from hazards — including thermal hazards.
- The Code mandates employers to assess and mitigate health risks to workers, with an emphasis on prevention over reaction.
- Contract workers are explicitly covered under the OSH Code — their deploying principal employer is also liable for conditions in which they work.
- Inspectors have broad powers to enter, inspect, and issue directions, including stopping work where an imminent danger to health exists.

Duty of Care and Legal Liability

Employer Duty of Care

Beyond statutory law, Indian courts have upheld employer liability in tort (negligence claims) for workplace injuries — including those resulting from failure to protect workers from known environmental hazards. If your company was aware of extreme heat conditions and failed to implement basic controls, civil liability can arise even without a specific heat regulation.

- Workmen's Compensation Act / Employee Compensation Act: Heat stroke and heat exhaustion qualify as occupational diseases. Workers and their families may claim compensation for injury or death.
- ESI (Employees' State Insurance) Act: Employers in ESI-covered establishments must report occupational illness claims. Repeated claims may trigger audits.
- Contract Labour (Regulation and Abolition) Act: Principal employers remain responsible for working conditions of contract workers deployed on their premises.

⚠ IMPORTANT

Maintaining records of heat stress assessments, training attendance, and incident investigations is your primary legal protection. If you cannot demonstrate that you took reasonable steps, your liability exposure increases significantly.

5. Why Most Companies Fail at Heat Stress Management

Most heat stress incidents in India are not the result of extraordinary conditions — they are the result of ordinary failures in planning and supervision. Global research identifies a consistent pattern of gaps that contribute to heat illness and fatality.

Failure 1: No Hydration Planning

Water is available, but access is not managed. Workers walk 200–400 metres to reach water or wait until lunch. No electrolyte replacement is planned. Workers who have already lost 2% of body weight through sweating have measurably impaired performance and increased heat risk.

What Good Looks Like

Hydration stations within 30 metres of every active work zone. Fresh water replenished every hour. ORS (oral rehydration salts) available. Supervisors responsible for tracking hydration compliance. Workers briefed on drinking 250ml every 20 minutes during heavy outdoor work.

Failure 2: No Structured Rest Cycles

Workers may get a single lunch break but are expected to work continuously between breaks. On construction sites, rest breaks are informal and often skipped when deadlines approach. The body needs time to reduce its core temperature during extreme heat — continuous work prevents this.

What Good Looks Like

Formal work-rest schedules implemented for all outdoor and hot-environment work above 35°C. For heavy physical work in >40°C conditions, rest periods of 15 minutes every 45 minutes are recommended. Supervisors are accountable for enforcing rest cycles.

Failure 3: Lack of Awareness — Workers and Supervisors

Many workers do not know the signs of heat stroke or what to do if they experience heat exhaustion. Equally, many supervisors confuse sweating with adequate cooling — a worker who stops sweating in the heat is in acute danger, not adapting.

What Good Looks Like

Annual summer safety inductions for all workers. Toolbox talks on heat stress before each summer season begins. Supervisor-specific training on recognising symptoms and activating emergency response. Workers are empowered to report symptoms without fear.

Failure 4: Inadequate Emergency Response

When a heat stroke occurs, the first 30 minutes are critical. Most sites have no documented emergency response protocol. Supervisors call the site manager who calls the safety officer who calls a hospital — valuable time is lost. Without immediate cooling, heat stroke causes permanent organ damage or death.

> **What Good Looks Like**
> A documented, practised heat stroke response procedure at every site. First responders trained and identified. Ice packs or cold water immersion available. Nearest hospital with emergency capability pre-identified. Emergency contact numbers posted at key locations.

Failure 5: No Environmental Monitoring

Most companies have no mechanism to track temperature or humidity at the worksite. Managers rely on weather apps or general awareness, not systematic monitoring. They do not adjust work schedules when temperature spikes, and no one escalates when wet bulb temperatures reach dangerous thresholds.

> **What Good Looks Like**
> Daily temperature and humidity readings at the start of each shift. A simple heat risk colour code (Green/Amber/Red) communicated to supervisors each morning. Work schedules adjusted based on conditions — not fixed regardless of weather.

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6. Heat Stress Risk Assessment Framework

A structured risk assessment is the foundation of any effective heat stress management programme. It ensures that your controls are targeted where the risk is highest.

Step-by-Step Heat Risk Assessment Process

1. Identify all work areas and roles with potential heat exposure — both outdoor and indoor.
2. Record peak ambient temperatures for each area during summer months (use local IMD data as a baseline).
3. Assess physical workload — categorise activities as light, moderate, heavy, or very heavy.
4. Note environmental factors: direct sunlight, radiant heat sources (furnaces, metal roofing), humidity, and airflow.

5. Account for worker-specific factors: new or returning workers, age (>45 or <25), health conditions, PPE worn.
6. Apply the risk matrix below to determine a risk level.
7. Assign and implement controls based on risk level.
8. Review after any incident and at the start of each summer season.

Heat Stress Risk Scoring Matrix

Temperature (°C)	35–40°C	40–43°C	43–46°C	> 46°C
Light (desk, slow walking)	**LOW**	**LOW**	**LOW**	**MODERATE**
Moderate (walking, light lifting)	**LOW**	**MODERATE**	**HIGH**	**HIGH**
Heavy (shovelling, climbing, carrying)	**MODERATE**	**HIGH**	**HIGH**	**VERY HIGH**
Very Heavy (intense manual labour)	**HIGH**	**VERY HIGH**	**VERY HIGH**	**EXTREME**

Note: Increase risk level by one category for: workers in their first 14 days, workers aged over 50, workers with known health conditions, workers wearing full-body PPE.

Required Controls by Risk Level

Risk Level	Minimum Required Controls
LOW	Hydration available, basic awareness training, annual review.
MODERATE	Hydration plan + ORS, scheduled rest breaks, daily temperature check, supervisor briefed.
HIGH	All above + reduced work hours in peak heat, shade structures, buddy system, emergency protocol activated.
VERY HIGH	All above + rotate workers every 45 min, pre-cooling options, nurse/first aider on-site, IMD alert monitoring.
EXTREME	Suspend or reschedule non-essential work. Only emergency work with full protocol. Continuous supervision. Senior management authorisation required.

7. Workplace Hydration Management Plan

Dehydration is the most common and most preventable contributor to heat illness. A systematic hydration plan is simple to implement and has an immediate impact.

How Much Water Does a Worker Need?

Condition	Minimum Water Required	With ORS Supplement
Office / light indoor work	2 litres per day	Not required unless sweating heavily
Moderate outdoor work (< 38°C)	4–5 litres per shift	1 ORS sachet mid-shift recommended
Heavy outdoor work (38–42°C)	5–7 litres per shift	2 ORS sachets per shift — mandatory
Very heavy outdoor work (> 42°C)	7–10 litres per shift	Every 2 hours + electrolyte drink

Golden Rule of Hydration

Workers should drink 250ml of water every 20 minutes during heavy outdoor work — regardless of whether they feel thirsty. Thirst is a late indicator of dehydration. By the time a worker feels thirsty, they may already have a 1–2% body fluid deficit.

Hydration Station Setup Requirements

- Location: Maximum 30 metres from any active work zone.
- Container: Insulated, clearly labelled, and kept in shade. Water should be cold (ideally 10–15°C).
- Replenishment: Supervisors must check and refill containers every 2 hours.
- ORS availability: Pre-mixed ORS sachets (e.g., Electral or Enerzal) must be stocked at all stations.
- Hygiene: Clean disposable cups or personal water bottles only. No shared containers.
- Signage: Bilingual signs (Hindi + local language) reminding workers to drink regularly.

Hydration Planning Template

Work Zone / Area	No. of Workers	Water Required (L)	ORS Sachets	Refill Schedule
Zone A — Excavation	8	48 L	2	6 AM, 8 AM, 10 AM, 12 PM
Zone B — Concreting	16	96 L	4	6 AM, 8 AM, 10 AM, 12 PM
Zone C — Formwork	24	144 L	6	6 AM, 8 AM, 10 AM, 12 PM
Zone D — Finishing	32	192 L	8	6 AM, 8 AM, 10 AM, 12 PM
Zone E — Compound	40	240 L	10	6 AM, 8 AM, 10 AM, 12 PM

Note: The above template is a sample. Populate with your actual work zones, worker count, and shift timings.

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8. Work-Rest Cycle Planning

Physical exertion increases internal body heat production significantly. A 70kg worker doing heavy lifting generates more than 300 watts of metabolic heat. Without rest, this builds up faster than the body can dissipate it — especially in high temperature, high humidity conditions.

When to Schedule Heavy Work

- Schedule heavy physical tasks (excavation, concrete pouring, heavy lifting, welding) before 10 AM and after 4 PM.
- Between 11 AM and 3 PM — the highest heat period — restrict active work to light or moderate tasks only.
- Consider starting shifts at 6 AM during May and June to take advantage of cooler morning conditions.
- Night shifts for heat-intensive work should be considered during peak heatwave periods (when daytime temp exceeds 45°C).

Recommended Work-Rest Schedules

Temperature (°C)	Physical Demand	Work Duration	Rest Duration
35–38°C	Light	50 min	10 min shade break
35–38°C	Moderate	45 min	15 min shade break
38–41°C	Light	45 min	15 min shade break
38–41°C	Moderate	30 min	30 min shade break
38–41°C	Heavy	30 min	30 min — mandatory cooling
> 41°C	Light	30 min	30 min shade + water
> 41°C	Moderate	20 min	40 min — consider suspension
> 41°C	Heavy	STOP — Reschedule to cooler hours	

Sample Work Schedule — Outdoor Construction (Summer, May–June)

Time Slot	Activity	Notes
6:00–6:30 AM	Toolbox Talk + Hydration	Pre-shift briefing. Each worker drinks 500ml water.
6:30–8:30 AM	**HEAVY WORK — Peak Productivity Window**	Concrete pouring, excavation, heavy lifting.
8:30–8:45 AM	SHADE REST + WATER	250ml water minimum. ORS if sweating heavily.
8:45–10:30 AM	**HEAVY / MODERATE WORK**	Continue heavy tasks. Monitor conditions.
10:30–11:00 AM	**MANDATORY COOL BREAK**	Shade rest. Water + ORS. Supervisor checks for symptoms.
11:00 AM–12:30 PM	LIGHT/MODERATE ONLY	No heavy lifting. Finishing, checking, light tasks only.
12:30–1:30 PM	LUNCH + EXTENDED REST	Mandatory. Workers stay in shade/canteen. No work.
1:30–3:00 PM	LIGHT WORK ONLY	Avoid strenuous activity. Prioritise shade work.
3:00–3:15 PM	REST + WATER	Short break. Hydration check.
3:15–5:00 PM	**MODERATE–HEAVY WORK**	Temperature drops. Resume heavier tasks if conditions allow.

Time Slot	Activity	Notes
5:00 PM	SHIFT END	Supervisor debrief. Report any health concerns before dispersal.

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9. Early Symptoms Recognition Guide

The most important skill for supervisors and workers is recognising heat illness early — before it becomes a medical emergency. The following checklists should be trained into every supervisor and posted visibly at worksites.

Worker Self-Monitoring Checklist

Workers should STOP AND REPORT to their supervisor if they experience any of the following:

[]	Throbbing headache	[]	Feeling unusually tired or weak
[]	Dizziness or light-headedness	[]	Cramps in muscles (legs, stomach)
[]	Nausea or desire to vomit	[]	Rapid heartbeat
[]	Confusion or difficulty thinking clearly	[]	Very dark yellow or brown urine
[]	**Stopping sweating when it is very hot (CRITICAL)**	[]	Feeling faint or unsteady

Supervisor Observation Checklist — Daily Monitoring

Supervisors should visually assess workers at regular intervals and act on any of the following observations:

- Worker appears pale, flushed (red face), or has clammy/wet skin
- Worker is moving more slowly than usual or appears uncoordinated
- Worker is unusually quiet, confused, or irritable
- Worker stops sweating during intense physical activity in extreme heat (EMERGENCY SIGN)
- Worker collapses, stumbles, or loses consciousness
- Worker complains of chest tightness or rapid heart rate
- Worker has not been seen drinking water for more than 30 minutes
- Urine check (if facilities available): dark yellow or brown indicates severe dehydration

> ⚠ **EMERGENCY SIGN — IMMEDIATE ACTION REQUIRED**
> If a worker STOPS SWEATING in extreme heat and appears confused or acts abnormally — this is a heat stroke. Do NOT wait. Call emergency services immediately and begin cooling the person.

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10. Emergency Response Plan for Heat Stroke

Heat stroke is a life-threatening emergency. When core body temperature exceeds 40°C, the brain and vital organs are at risk. Every minute without cooling increases the risk of permanent damage or death. Every supervisor must know this protocol and practise it before summer begins.

Immediate Response Protocol — First 10 Minutes

STEP	ACTION REQUIRED
1	CALL FOR HELP — Shout for the nearest co-worker, supervisor, and first aider. Do not leave the affected person alone. CALL 108 (Emergency Ambulance) immediately.
2	STOP WORK — Clear the immediate area. Remove the worker from the heat source immediately.
3	COOL IMMEDIATELY — This is the most critical step. Move to shade or air-conditioned area. Remove excess clothing. Apply cold/ice water to neck, armpits, and groin. Fan the person vigorously.
4	POSITION CORRECTLY — If conscious, lay the person on their back with legs elevated. If unconscious, place in recovery position (on side). Do not give water to an unconscious person.
5	MONITOR CONTINUOUSLY — Check breathing and consciousness every 1–2 minutes. Continue cooling until ambulance arrives or body temperature reduces.
6	DO NOT — Do NOT give alcohol, caffeinated drinks, or medication. Do NOT delay hospital transport.
7	AMBULANCE ARRIVAL — Inform paramedics: time of onset, temperature of worksite, water intake, duration of work, any medications the worker takes.

Emergency Contact Card (Post at Every Work Zone)

EMERGENCY NUMBERS	SITE EMERGENCY CONTACTS

National Ambulance: 108 Police Emergency: 100 Nearest Hospital: _____ Hospital Contact: _____	Site Safety Officer: _____ Site Manager: _____ First Aider Name: _____ First Aid Kit Location: _____

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11. Training & Awareness Programme

Knowledge is the first line of defence. International research consistently shows that even experienced safety professionals have significant gaps in heat stress knowledge — particularly in emergency response and exposure limits. A structured training programme addresses this at every level of your organisation.

Three-Level Training Structure

Level 1: Worker Awareness Training (All workers, before summer)

Duration: 1.5 hours | Format: Group session in local language | Frequency: Annual (plus refresher after heatwave alert)

Topics to cover:

- What is heat stress and how it harms the body
- How to recognise your own symptoms and when to stop
- The importance of drinking water regularly — not waiting until thirsty
- How to recognise signs of heat illness in a co-worker
- Who to report to and what happens when you report a symptom
- Your rights — you cannot be penalised for stopping work due to heat illness

Level 2: Supervisor Training (All frontline supervisors)

Duration: 3 hours | Format: Classroom + practical | Frequency: Annual + before each summer season

Topics to cover:

- Risk assessment — identifying high-risk workers and work zones
- How to read and use temperature/humidity data
- Implementing work-rest cycles and hydration protocols
- Symptom recognition — what to look for during site rounds
- Emergency response — practise the heat stroke protocol

- Documentation — how to record and report heat stress events

Level 3: EHS Manager / HR Training (Annual certification)

Duration: Full day | Format: Classroom + site assessment | Frequency: Annual

Topics to cover:

- Legal requirements under Factories Act and OSH Code
- Heat stress risk assessment methodology and documentation
- Designing site-specific heat stress management plans
- Incident investigation and root cause analysis for heat events
- Reporting obligations and interface with regulatory inspectors

Daily Summer Toolbox Talks (May–September)

Every supervisor should conduct a 5–10 minute heat safety briefing at the start of each shift during summer months. Use the following structure:

1. Check the day's temperature forecast — state the risk level (Green/Amber/Red) for the day.
2. Remind workers of the water schedule — when and where to drink.
3. Identify any workers who may be at higher risk today (new joiners, returned from leave, visible unwell).
4. Confirm the location of the first aid kit and emergency contact numbers.
5. Ask if anyone has concerns or questions.

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12. Implementation Roadmap — 30-Day Summer Readiness Plan

This roadmap gives EHS managers and HR heads a concrete action plan to implement before the summer season begins. Start this plan no later than 60 days before peak summer in your region.

Week	Actions	Owner	Status
Week 1(Days 1–7)	Conduct heat stress risk assessment across all work areas. Identify high-risk zones, high-risk worker groups, and current gaps. Review last year's incidents.	EHS Manager + Site Supervisors	[ ] Pending

Week	Actions	Owner	Status
Week 1(Days 1–7)	Identify and document nearest hospitals with emergency capability. Update emergency contact cards.	HR / Admin Team	[ ] Pending
Week 2(Days 8–14)	Procure all required materials: insulated water containers, ORS sachets, cold packs, shade structures, digital thermometers/humidity meters.	Procurement / EHS	[ ] Pending
Week 2(Days 8–14)	Conduct supervisor training sessions — heat stress recognition, emergency response practice, work-rest implementation.	EHS Manager	[ ] Pending
Week 3(Days 15–21)	Conduct worker awareness sessions at all sites. Sessions in local languages. Distribute laminated emergency cards.	Supervisors + HR	[ ] Pending
Week 3(Days 15–21)	Install hydration stations in all high-risk work zones. Confirm replenishment schedule and accountability.	Site Manager	[ ] Pending
Week 3(Days 15–21)	Publish summer work schedule — peak heat restrictions, work-rest cycles — and communicate to all supervisors.	EHS + Project Manager	[ ] Pending
Week 4(Days 22–28)	Simulate a heat stroke emergency drill at each major site. Identify gaps. Brief all supervisors on findings.	EHS Manager	[ ] Pending
Week 4(Days 22–28)	Establish daily temperature monitoring protocol. Assign responsibility per site. Set alert thresholds.	EHS + Supervisors	[ ] Pending
Week 4(Days 22–28)	Final review — compliance checklist completed for each site. Sign-off by site manager and EHS head.	EHS Head + Site Manager	[ ] Pending
Ongoing	Daily toolbox talks on heat safety throughout May–September. Incident reporting and response. Monthly review of measures.	All Supervisors	[ ] Ongoing

13. Heat Stress Compliance Checklist

Use this checklist to assess the readiness of each site before summer. Complete one checklist per site location. Score: 0 = Not Done, 1 = Partial, 2 = Fully Implemented

A. Risk Assessment & Planning

Requirement	Score (0–2)	Action Required
Heat stress risk assessment completed for this site	/2	
Heat risk zones identified and documented	/2	
High-risk worker groups identified (new joiners, older workers, health conditions)	/2	
Summer work schedule developed with work-rest cycles	/2	

B. Infrastructure & Equipment

Requirement	Score (0–2)	Action Required
Hydration stations installed within 30m of all active work zones	/2	
Insulated water containers maintained and replenished every 2 hours	/2	
ORS sachets stocked at all hydration stations	/2	
Shade structures/rest areas available for all workers	/2	
Digital thermometer/humidity meter available and used daily	/2	
Emergency first aid kit stocked and accessible	/2	

C. Training & Awareness

Requirement	Score (0–2)	Action Required
All workers completed heat stress awareness training	/2	
All supervisors completed heat stress supervisor training	/2	
Daily summer toolbox talks scheduled and occurring	/2	
Emergency procedures posted in local language at all key locations	/2	

D. Emergency Preparedness

Requirement	Score (0–2)	Action Required
Heat stroke emergency response protocol documented	/2	
All supervisors trained in heat stroke response	/2	
Emergency contact numbers posted at all work zones	/2	
Nearest hospital with A&E capability identified	/2	
Emergency drill conducted and gaps addressed	/2	

E. Monitoring & Documentation

Requirement	Score (0–2)	Action Required
Daily temperature and humidity recorded at site	/2	
Heat risk level communicated to supervisors each morning	/2	
Heat stress incidents logged and investigated	/2	
Monthly review of heat stress measures completed	/2	

TOTAL SCORE: _____ / 50

40–50: Compliant | 25–39: Improvement Needed
Below 25: High Risk — Immediate Action Required

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14. Conclusion — Employer Responsibility & Benefits

Heat stress management is not a seasonal exercise. It is a fundamental component of a responsible, compliant, and productive workplace. The summer of 2024 broke heat records across India. The summer ahead will challenge your workforce — the question is whether your organisation is prepared.

What You Gain by Acting Now

Reduced Incidents	Organisations that implement comprehensive heat stress management programmes report up to 80% fewer heat-related injuries. The investment in water, rest, and shade is a fraction of the cost of one hospitalisation.

Legal Protection	Documented risk assessments, training records, and incident reports are your primary defence in any regulatory inspection or legal claim. Act before an incident — not after.
Productivity Improvement	Work-rest cycles, properly managed, do not reduce output — they optimise it. Workers who are cooled, hydrated, and rested deliver higher quality work with fewer errors and accidents.
Worker Trust & Retention	Workers who feel protected are more loyal, more engaged, and less likely to leave. In industries with high attrition, a reputation for worker welfare improves recruitment and reduces training costs.
Project Continuity	Heat incidents shut down projects. Regulatory inspections, police complaints, and hospital admissions all cause delays. Prevention keeps your timeline intact.

The Bottom Line for Every Employer

You employ people who depend on you for their livelihood and their safety. Protecting them from heat is not a burden — it is a responsibility, a legal obligation, and a business advantage. Start today.

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14. Reference standards and legal norms used in the Heat Stress Management Manual for Indian Worksites

#	Standard / Act / Code	Type	Authority / Body	Section / Clause Referenced	Relevance in Manual
INDIAN LEGISLATION					
1	Factories Act, 1948	Indian Law	Ministry of Labour & Employment, GoI	Section 11 (Cleanliness), Section 13 (Ventilation & Temperature), Section 14 (Dust & Fumes), Section 15 (Artificial Humidification)	Section 4 — Legal & Compliance
2	Occupational Safety, Health & Working Conditions Code, 2020 (OSH Code)	Indian Law	Ministry of Labour & Employment, GoI	Chapter IV (Health, Safety & Working Conditions), employer duty to provide safe working environment free from hazards including thermal hazards	Section 4 — Legal & Compliance
3	Employee Compensation Act, 1923 (amended 2017)	Indian Law	Ministry of Labour & Employment, GoI	Schedule III — Occupational diseases including heat stroke as compensable illness	Section 4 — Liability

#	Standard / Act / Code	Type	Authority / Body	Section / Clause Referenced	Relevance in Manual
4	Contract Labour (Regulation & Abolition) Act, 1970	Indian Law	Ministry of Labour & Employment, GoI	Principal employer responsibility for health & safety of contract workers deployed on their premises	Section 4 — Compliance
5	Employees' State Insurance Act, 1948 (ESI Act)	Indian Law	ESIC, GoI	Reporting obligations for occupational illness claims including heat illness	Section 4 — Compliance
6	Building & Other Construction Workers (RECS) Act, 1996	Indian Law	Ministry of Labour & Employment, GoI	Provision of drinking water, rest shelters, and basic welfare for construction workers	Sections 7, 8 (Industry Scenarios, Hydration)
INTERNATIONAL STANDARDS & GUIDELINES					
7	ILO — Heat Stress Campaign & Global Framework	International	International Labour Organization	Global estimates: 23 million heat-related injuries, 19,000 fatalities annually; 2.4 billion workers exposed; employer obligations for thermal risk management	Sections 1, 5 (statistics & risk context)
8	ACGIH — Threshold Limit Values (TLVs) for Heat Stress	Technical Std.	American Conference of Governmental Industrial Hygienists	WBGT-based exposure limits, metabolic workload classification (Light / Moderate / Heavy / Very Heavy), work-to-rest allocation tables, clothing adjustment factors	Sections 6, 8 (Risk Matrix, Work-Rest Cycles)
9	ISO 7933:2004 — Ergonomics of the Thermal Environment (PHS Model)	ISO Standard	International Organization for Standardization	Predicted Heat Strain model; physiological criteria for safe exposure duration; sweat rate limits	Sections 2, 6 (physiological basis, risk assessment)
10	ISO 7726:1998 — Instruments for Measuring Physical Quantities	ISO Standard	International Organization for Standardization	Measurement of WBGT (Wet Bulb Globe Temperature), black globe temperature, natural wet bulb, dry bulb; instrument calibration & placement guidelines	Section 6 (environmental monitoring)
11	ISO 9886:2004 — Evaluation of Thermal Strain by Physiological Measurements	ISO Standard	International Organization for Standardization	Core temperature, heart rate, body mass loss as indicators of heat strain; physiological limits for safe work	Sections 2, 9 (heat strain, symptom recognition)
12	ISO 15743:2008 — Cold Environments (Work Practices)	ISO Standard	International Organization for Standardization	Acclimatisation principles applicable by analogy to hot environment management; work scheduling frameworks	Section 8 (scheduling principles)
13	WHO — Heat and Health Guidelines	International	World Health Organization	Clinical definition of heat stroke (core temp > 40°C with CNS dysfunction); heat exhaustion criteria; first aid protocols; individual risk factors (age, chronic disease, dehydration)	Sections 2, 9, 10 (clinical definitions, symptoms, emergency response)
14	ILO — Occupational Safety & Health Convention, 1981 (No. 155)	International	International Labour Organization	Article 16: employers shall ensure workplaces are safe and without risk to health; Article 19: workers have the right to stop work presenting imminent serious danger	Section 4 (Duty of Care)
15	NIOSH — Criteria for a Recommended Standard: Occupational Exposure to Heat	International	National Institute for Occupational Safety and Health (US)	Recommended exposure limits (RELs) for occupational heat stress; work-rest ratios by workload and environment; acclimatisation schedule (7–14 days for new workers)	Sections 6, 8 (risk assessment, work-rest, acclimatisation)
16	OSHA — Heat Illness	International	Occupational Safety	Water, rest, shade requirements; emergency response	Sections 7, 8, 10,

#	Standard / Act / Code	Type	Authority / Body	Section / Clause Referenced	Relevance in Manual
	Prevention Programme Standards	nal	& Health Administration (US)	obligations; training requirements for supervisors and workers; acclimatisation planning	11
TECHNICAL / SCIENTIFIC REFERENCES					
17	Tetzlaff et al. (2025) — HEPRU-OHSKAT Knowledge Assessment	Research	University of Ottawa / American Journal of Industrial Medicine	Four knowledge domains: general heat stress, signs & symptoms, exposure limits & monitoring, workplace controls; identified knowledge gaps in OHS professionals as basis for training programme design	Sections 5, 11 (training design rationale)
18	Flouris et al. (2018) — Workers' Health & Productivity Under Heat Strain	Research	Lancet Planetary Health	Systematic review: 20–30% productivity loss in heat-exposed workers; cognitive impairment at elevated core temperatures; health risk quantification	Sections 1, 3 (productivity impact, business case)
19	Ioannou et al. (2022) — Occupational Heat Strain in Outdoor Workers	Research	Temperature Journal	Meta-analysis of heat strain across outdoor worker populations; physiological response thresholds; construction, agricultural, and manufacturing sector data	Sections 2, 3 (sector risk scenarios)
20	Bureau of Indian Standards — IS 11229:1985 (Thermal Environment Assessment)	Indian Standard	Bureau of Indian Standards (BIS)	Assessment of thermal environments in Indian workplaces; WBGT application; metabolic rate estimation methods	Section 6 (risk assessment methodology)
FIELD & OPERATIONAL GUIDANCE					
21	Indian Meteorological Department (IMD) — Heatwave Guidelines	National Agency	Ministry of Earth Sciences, GoI	Heatwave definition for Indian conditions (≥ 40°C plains, ≥ 30°C hilly regions, or departure of 4.5°C+ from normal); district-level heat alerts; seasonal forecasting	Sections 6, 12 (monitoring, 30-day plan)
22	NDMA — Heat Wave Management Guidelines, 2019	National Guidance	National Disaster Management Authority, GoI	Employer responsibilities during heatwave alerts; worker protection measures; emergency response protocols; hydration and shade requirements for outdoor workers	Sections 4, 10, 12 (compliance, emergency response)
23	Red Cross / WHO — First Aid Guidelines (Heat Illness)	Internatio nal	International Federation of Red Cross & Red Crescent / WHO	First aid for heat exhaustion and heat stroke: cooling priority, positioning, fluid management, emergency escalation; CPR protocols for unresponsive victims	Section 10 (emergency response protocol)

DISCLAIMER

This guide has been developed based on international research, industry standards, and practical EHS field experience to support Indian workplaces in managing occupational heat stress. It is intended as guidance only and does not constitute legal advice. Employers are responsible for ensuring compliance with applicable Indian legislation, including the Factories Act 1948, the Occupational Safety Health and Working Conditions Code 2020, and any applicable state regulations. This document should be adapted to the specific conditions, hazards, and legal requirements of your industry and region.