

Construction Ergonomics Ergonomik Pembangunan by Shereen Montero

Designing Work for the Malaysian Worker
Mereka Bentuk Kerja untuk Pekerja Malaysia

Fitting the Task to the Worker

Padankan Tugas kepada Pekerja

Ergonomics is the science of designing the workplace to fit the capabilities and limitations of the Malaysian construction workforce. It aims to reduce injury and increase productivity by making tasks easier and safer.

Ergonomik adalah sains merekabentuk tempat kerja mengikut keupayaan dan had pekerja pembinaan. Ia bertujuan mengurangkan kecederaan.



The Toll of Site Injuries

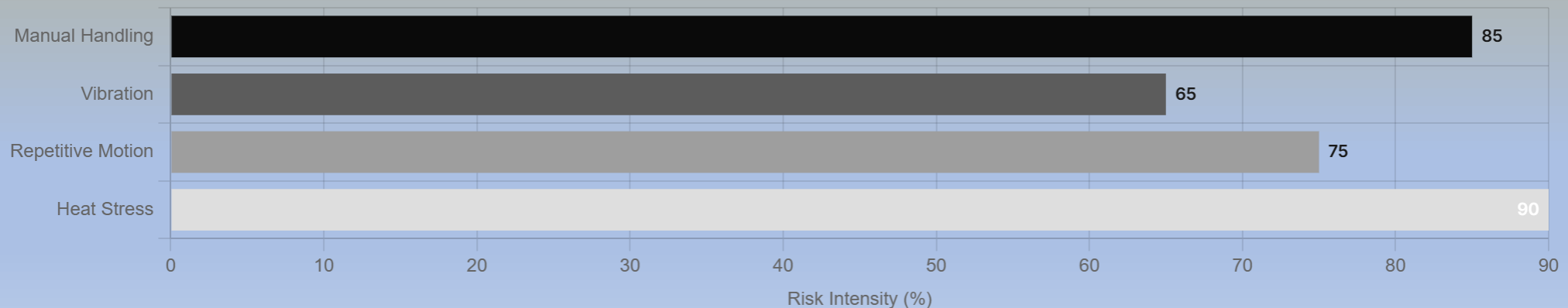
Kesan Kecelakaan di Tapak

5,290

Injuries in 2023
Kecelakaan 2023

696

MSD Cases Reported
Kes MSD Dilaporkan



Site Ergonomic Risks Risiko Ergonomik Tapak

Identifying common hazards in the Malaysian construction field
Mengenalpasti bahaya biasa di tapak pembinaan Malaysia

Common Risk Factors | Faktor Risiko Utama

Manual Material Handling Pengendalian Manual

Lifting cement bags, carrying timber, and pulling steel bars increase spinal strain.

Mengangkat beg simen dan membawa kayu menambah tekanan tulang belakang.

Vibration Hazards Bahaya Getaran

Prolonged use of jackhammers and power tools leads to nerve damage (HAVS).

Penggunaan tukul gerudi yang lama menyebabkan kerosakan saraf tangan.

Repetitive Motions Pergerakan Berulang

Frequent bricklaying or plastering movements wear down joints over time.

Pergerakan menyusun bata atau melepa yang kerap merosakkan sendi.

Heat Stress (31–33°C) Stres Haba

Malaysia's humidity increases fatigue, leading to awkward postures and slips.

Kelembapan Malaysia meningkatkan keletihan, membawa kepada postur yang salah.

Work-Related Musculoskeletal Disorders (MSDs)

Gangguan Muskuloskeletal Berkait Kerja

MSDs affect the muscles, nerves, tendons, and joints. Chronic neglect leads to permanent disability. Common types include:

- Lower Back Pain (Sakit Belakang)
- Carpal Tunnel Syndrome (Sakit Pergelangan Tangan)
- Tendonitis (Radang Tendon)
- Shoulder Strain (Ketegangan Bahu)



Ergonomic Control Principles Prinsip Kawalan Ergonomik

Engineering, Administrative, and PPE solutions
Penyelesaian Kejuruteraan, Pentadbiran, dan PPE

Hierarchy of Controls | Hierarki Kawalan

Engineering Controls Kawalan Kejuruteraan

- Use mechanical hoists and trolleys.
- Adjust work surface heights.
- Use vibration-dampening tool handles.

Gunakan alat pengangkut mekanikal dan pemegang alat anti-getaran.

Administrative & PPE Pentadbiran & PPE

- Job rotation (every 2 hours).
- 7–14 days heat acclimatization.
- Wear anti-vibration gloves and knee pads.

Penggiliran kerja dan penggunaan sarung tangan anti-getaran.

Safe Manual Handling Teknik Pengendalian Selamat

Best practices for lifting, carrying, pushing, and pulling
Amalan terbaik untuk mengangkat, membawa, menolak, dan menarik

Safe Lifting & Moving | Mengangkat & Bergerak

Lifting & Carrying Angkat & Bawa

- Plan the lift: Check for obstacles.
- Keep the load close to the body.
- Bend knees, not the back.
- Avoid twisting while carrying.

Bengkokkan lutut, jangan bengkokkan belakang. Pastikan beban rapat ke badan.

Pushing & Pulling Menolak & Menarik

- Push rather than pull whenever possible.
- Use your body weight to move the load.
- Keep wrists straight and grip firm.
- Ensure wheels/rollers are maintained.

Tolak lebih baik daripada tarik. Gunakan berat badan anda untuk bergerak.

Bricklaying & Plastering Postures

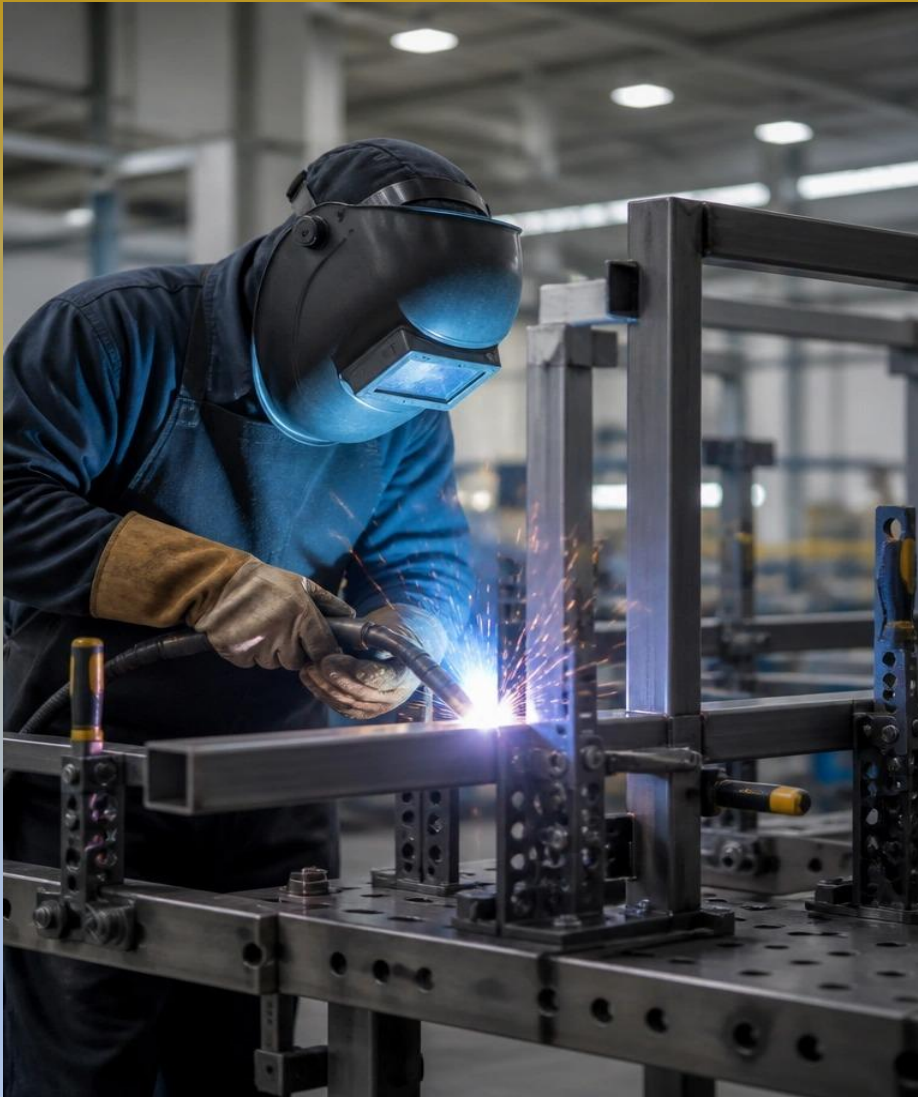
Postur Menyusun Bata & Melepa

Bricklaying often involves repetitive bending. Use adjustable scaffolding to keep the work at waist height.

Plastering above shoulder level causes neck strain. Use platform steps or stilts to keep the work within reach without overstretching.

Pastikan ketinggian kerja pada paras pinggang untuk mengelakkan bongkok.





Welding & Using Power Tools

Kimpalan & Alat Kuasa

Welding requires sustained static postures. Use jigs to hold workpieces and avoid crouching.

When using power tools, maintain a neutral wrist position. Support the weight of the tool with both hands to distribute the load.

Gunakan ragum untuk memegang bahan kimpalan. Sokong berat alat dengan kedua-dua belah tangan.

Rest, Stretch, and Rotate

Rehat, Regang, dan Gilir

Short, frequent breaks are more effective than one long break in hot weather. Rotate workers every 2 hours between heavy and light tasks to allow muscle recovery.

Rehat pendek yang kerap adalah lebih berkesan. Gilirkan pekerja setiap 2 jam.

Mechanical Aids & Assistive Devices

Bantuan Mekanikal & Peranti Bantuan

Eliminate the need for manual handling using:

- Trolleys & Carts (Troli)
- Material Hoists (Lif Bahan)
- Hydraulic Lift Tables (Meja Lif Hidraulik)
- Suction Grips for glass/panels

Pelaburan dalam bantuan mekanikal mengurangkan kos pampasan kecederaan pekerja dalam jangka masa panjang.



Laws & Regulations Undang-Undang & Peraturan

Malaysian OSH Act 2022 and worker responsibilities
Akta KKP Malaysia 2022 dan tanggungjawab pekerja

Legal Duties & Penalties

Tanggungjawab & Penalti

Under the OSHA (Amendment) Act 2022:

- Employers must ensure a safe work environment.
- Maximum fine for violations is RM500,000.
- Sites with 5+ employees must appoint an OSH Coordinator.

Workers must follow safety instructions and use provided PPE.

Failure to cooperate is an offence under Section 24.

Denda maksimum RM500,000 untuk majikan yang ingkar.

Condition	Requirement
5+ Employees	OSH Coordinator
OSHA 2022 Fine	Max RM500,000
Heat Acclim.	7–14 Days

Responsibilities under OSHA 2022 | Tanggungjawab di bawah OSHA 2022

Employer Duties

Tanggungjawab Majikan

- Conduct HIRARC (Risk Assessment).
 - Provide ergonomic assistive tools.
 - Training and proper PPE supply.
 - Appoint OSH Coordinator (if 5+ employees).
- Menyediakan persekitaran kerja selamat dan latihan.

Worker Duties

Tanggungjawab Pekerja

- Wear provided PPE (Knee pads, gloves).
 - Report ergonomic hazards immediately.
 - Follow safe lifting procedures.
 - Cooperate with safety training.
- Patuhi arahan keselamatan dan lapor bahaya.

Work Safe, Stay Strong Kerja Selamat, Kekal Kuat

Ergonomics ensures you go home healthy every day.
Ergonomik menjamin anda pulang sihat setiap hari.

THANK YOU