行政院及所屬各機關出國報告

出國類別：考察

瑞士勞工健康提昇相關研究考察報告

服務機關：行政院勞委會勞工安全衛生研究所

出國人職稱：研究員

姓名：杜宗禮

出國地區：瑞士

出國期間：八十九年十月二十六日至十一月六日

報告日期：九十年二月二日

J4/C0890702

目　　次

摘　　要

考察世界衛生組織職業衛生部門，探討疾病所造成的社會、經濟方面之成本，並體會到發展指標來評估相當重要，以及國際勞工組織職業衛生部門及其工作安全部，了解其國際職業安全衛生資訊中心之運作，以及對已開發及開發中國家職業安全衛生狀況之資料收集與統計分析。而日內瓦大學醫學中心有關法醫解剖、毒理檢查相關研究也和我國外勞猝死之研究、工作相關死亡之監控等工作關係密切。考察聯邦政府職業安全衛生部參酌國際勞工組織或歐盟的相關法規，建立私有勞動法與公立勞動法，重視工作安全與健康勞工保護，以及探討瑞士有關人因工程相關之現況。我國雖然不是聯合國之成員，但以安全衛生的角度出發，應該多進行國際交流，並提昇我國勞工職業健康之水準。

壹、目的

本次考察乃爲了探討瑞士政府及所在地相關國際組織（如世界衛生組織、國際勞工組織），對於勞工健康提升以及職業病預防之相關施政及研究、醫療等措施以及對我國可能之之應用。

貳、訪問過程

本次行程在榮總鄧主任之介紹我國駐日內瓦辦事處呂處長慶龍後積極展開，原先我在新加坡之 2000 年 ICOH 研討會也見到了 Dr. Satoh 以及聽到 Dr. Takala 的演講，就積極聯絡安排，後來我國駐瑞士代表處王祕書等人也積極協助相關行程之安排，因此得以順利成行。瑞士之山光水色不在話下，其獨特有之永久中立國身分到底對施政及學術研究有何影響？以及在日內瓦這個眾多國際組織所在（如聯合國歐洲分部、國際紅十字會、世界貿易組織、世界衛生組織、國際勞工組織）地的特殊文化氣息又是如何？也是本次行程亟欲了解的。我國近年來積極加入世界衛生組織，每年都有許多衛生界之醫師、學者、官員、民意代表來此參加相關活動，而我國職業醫學方面與世界衛生組織的接觸較少，也希望能夠打開。至於國際勞工組織的聯繫方面，相信我國有有一些官員代表與之接觸，但是有關於 WHO 與 ILO 所積極發展的職業傷害與疾病指標則是我想要從 ILO 獲得持續發展的管道。另一方面 SECO 瑞士聯邦政府之勞工安全衛生部以及學術研究單位也是亟欲接觸之單位，經聯絡協商之後安排了日內瓦大學醫學中心以及聯邦理工學院，後者全國僅有兩所（另一所位於洛桑）有接受政府之補助進行相關之研究。本次訪問行程計有：

一、拜訪世界衛生組織職業衛生部門（日內瓦）

二、拜訪國際勞工組織職業衛生部門（日內瓦）

三、拜訪日內瓦大學醫學中心（日內瓦）

四、拜訪聯邦政府職業安全衛生部（伯恩）

五、拜訪瑞士聯邦理工學院（蘇黎世）

參、訪問心得

瑞士位於歐洲中部，國土面積有 41,000 平方公里，比台灣稍大，分爲二十六省，使用四種語言（德、法、義、羅馬尼亞），有七百萬居民，參百萬勞工。聯邦的立法機構包括兩個議會：全國委員會（National Council）與國家委員會（Council of States）代表均由人民直接選舉。聯邦政府稱爲聯邦委員會（Federal Council），由七個部會組成：分別是外交、內政、法務、財政、經濟、國防及體育、環境交通能源。各省分權之事項爲教育（基礎教育、職業訓練）、健康政策（醫院規劃、醫療網絡）、經濟促進、稅務、警政、社會服務等。省之下有區（commune）現約有 3000 區，各區有相當大之自主權管理境內之建築、文化事物。以下就本次瑞士訪問部門提出心得：

一、拜訪世界衛生組織職業衛生部門

與 WHO 之 T. Satoh 醫師見面。他是屬於 Epidemiology and Burden of Disease（EBD）的醫師。從 Harvard 畢業之後短暫回日本之後，就來到 WHO 工作。這部門主要探討疾病所造成的社會、經濟方面之成本，因此發展指標來評估相當重要。例如 disease of burden 就採用了相當複雜的指標，目前正在各國學者討論中。另外還有我們已知的 DALY、等其他健康指標，可以詳見 WHO 年報。另外 EBD 也正在草擬第一版的國際殘障及功能分類（International Classification of Functioning and Disability）這是延續第一版的國際失能殘障分類（International Classification of Impairment, Disability and Handicap）故又稱 ICIDH-2，此搭配國際疾病分類（ICD－10）使用，將可以作爲工作能力損失之參考。我們也討論到是否可以將台灣之勞工職業傷病之資料放入 disease of burden 之公式，預計明年初此兩工具都會定案並推廣，我們將留意之。

二、拜訪國際勞工組織職業衛生部門

我們拜訪的是 ILO 的工作安全部（SafeWork），本身也是國際職業安全衛生資訊中心（International Occupational Safety and Health Information Center），

Director Dr. Takala 親自於百忙中接見。ILO 的 SafeWork 致力於 ILO 安全衛生標準之制定與建議之運用，以及各國職業安全衛生狀況之資料收集與統計分析，對於開發中國家所面臨的安全衛生問題也特別著力。目前正在菲律賓等國進行安全衛生狀況調查，也希望能收集各國之相關調查問卷，我也將把我國每三年一次之勞工安全衛生知識態度行爲調查問卷寄給他。目前我國尚未列入國際職業安全衛生資訊中心會員（稱 CIS member），此會員資格有權力義務提供並接收安全衛生相關資訊，除了國家會員之外，也有整合中心（Colloboration Center）會員，我們目前可朝此方向努力加入 ILO，一方面減少不必要之阻力，一方面與 ILO SafeWork 合作互相分享資料，並協助東南亞國家或是大陸進行安全衛生相關工作。目前 ILO 正發展 OSH-MS，挑戰 ISO 系統、OHSAS 18001 等，預計明年四月正式推出，但他的目的乃作爲各國之參考，並不意圖做商業之推銷。目前 ILO 的職業安全衛生百科全書（Encyclopedia of Occupational Safety and Health）已修改至第四版。中文版中國大陸也正翻譯中。ILOSafeWork 的資料庫資料也相當豐富，最近也開發職業危害（job Hazard）資料庫，值得進一步注意。

三、拜訪日內瓦大學醫學中心

日內瓦大學醫學中心包括醫學院與醫院。特別拜訪法醫中心教授兼日內瓦邦法醫處長 Dr. Romano La Harpe。因爲我國職業安全衛生研究之工作也和法醫關係密切，如外勞猝死之研究、工作相關死亡之監控等。該單位分成兩部分一爲法醫解剖、貳爲毒理檢查 ，前者由警方決定要否解剖調查，該處可接受或拒絕案子。後者包括酒精測試、藥物檢驗。全國有數十位法醫，法醫之養成需接受五年之訓練。該模式有點像是我國毒物防治中心、高檢署法醫中心、法醫研究所之綜合體、 該法醫中心負責日內瓦邦之業務，包括兩位在職、兩位受訓中法醫師以及工作人員 20 餘位。

四、拜訪聯邦政府職業安全衛生部

聯邦政府職業安全衛生部是在經濟委員會秘書處（State Secretary for Economic Affairs，簡稱 SECO）底下之勞工部（Directorate of Labor）。由該部門之法律服務處（Legal Service）之 Mz. & Dr. Nathalie Kocherhans 律師以及勞動健康處（Labor and Health）之 Ulrich Schwaninger 醫師接見。簡介了瑞士聯邦之概況。目前 78% 的企業雇用員工十人以下（含自雇），17 %爲員工 50 人以下，3.8% 是 50～250 人，250 人以上僅站所有企業之 0、6 %（但可能佔所有就業人口之相當大部分），失業率爲 1.7 %。

瑞士除自定法律以外也參酌 ILO 或 EU 的相關法規。目前瑞士勞工法之系統包括兩大部分：私有勞動法與公立勞動法，前者規範個人之間之勞動關係，如工作之責任、契約期間、假期、休假、勞工人格之保護（如性騷擾等），由法院判定。後者規範國家與個人間之勞動關係，如工作安全與健康、最大工時、工作時間、假日工作、輪班工作年輕或懷孕勞工保護、工資補償等事項，由勞動檢查員職行。聯邦工作意外法（Federal Accident Law）規定所有之勞工均要加入意外保險，SUVA 就是國家成立之保險公司辦理職業災害之保險，今也擴及非工作相關意外，目前有 180 萬被保險人。在工業界之勞工均需向 SUVA 投保，保險費依照工作危險度定費率，並訂有職災保護法（Odinance on Accident Prevention）撥付保費收入之 6.5 %於職災預防，並設有職災預防專責部門。另有聯邦安全工作整合委員會（Federal Coordination Committee for Security at Work）整合相關團體組織之安全衛生活動，分配職災預防之經費於相關部門領域。目前勞動檢查員聯邦約有 60 人，各省有 160 人，SUVA 有 350~400 人。目前其職業病種類表不包括工作壓力、下背痛、中風，也沒有法令規定之健康檢查項目，但有些大公司自行做員工之視力檢驗。

五、拜訪瑞士聯邦理工學院

蘇黎世瑞士聯邦理工學院（ETH）的衛生及應用生理研究所（Institute of Hygiene and Applied Physiology）的所長 Helmut Krueger 教授及 Thomas Laubli

醫師接見。主要談及人因工程相關之研究，目前其有一運動神經原之研究情數位博士後研究員之人力發展研究中，應用了通訊技術中信號資訊之技術，以及機電圖來分辨種勞動運動時肌肉之使用情形，區分必須與不必須使用肌，例如使用上肢伸肌或屈肌時有時連背部肌肉也收縮，造成不必要之肌肉緊張與疲勞，導致骨骼肌肉疼痛。因此可以教育訓練勞工正確的施力或復健措施。其他如工作中休息時的光線照明、呼吸型態與放鬆、可戴式電腦（主要研究視網膜如何接收外界訊號）、肌肉強化訓練等都有許多之傑出研究，也談及將來可以結合中國之傳統功夫、醫學（如氣功、吐納）進行相關之研究。

肆、建議

本次考察了瑞士有關職業病防制及健康促進相關的醫療、行政及研究措施，也瞭解到國際性組織在職業安全衛生上扮演角色的重要性，我國雖然不是聯合國之成員，但相信以科技、專業以及醫療救人、安全衛生的角度出發，多多進行國際交流工作，並且經常關心國際上安全衛生領域的脈動，應該有機會參與更多國際安全衛生之工作，有益於我國職業衛生、勞工健康水準的提升。

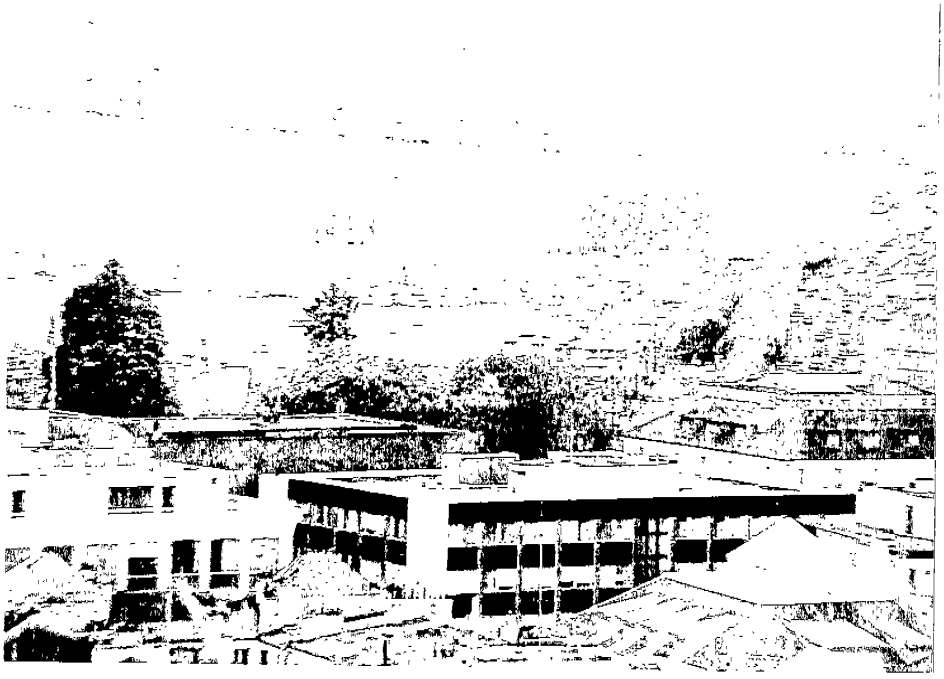
伍、附圖（如後）

陸、附圖（如後）

一.瑞士聯邦政府職業安全衛生部所屬 SECO 之組織架構

二.瑞士聯邦政府職業病種類表

三.國際勞工組織人因工程的資訊手冊



日內瓦，是世界許多國際組織的所在地

和世界衛生組織 Dr.Satoh 合影

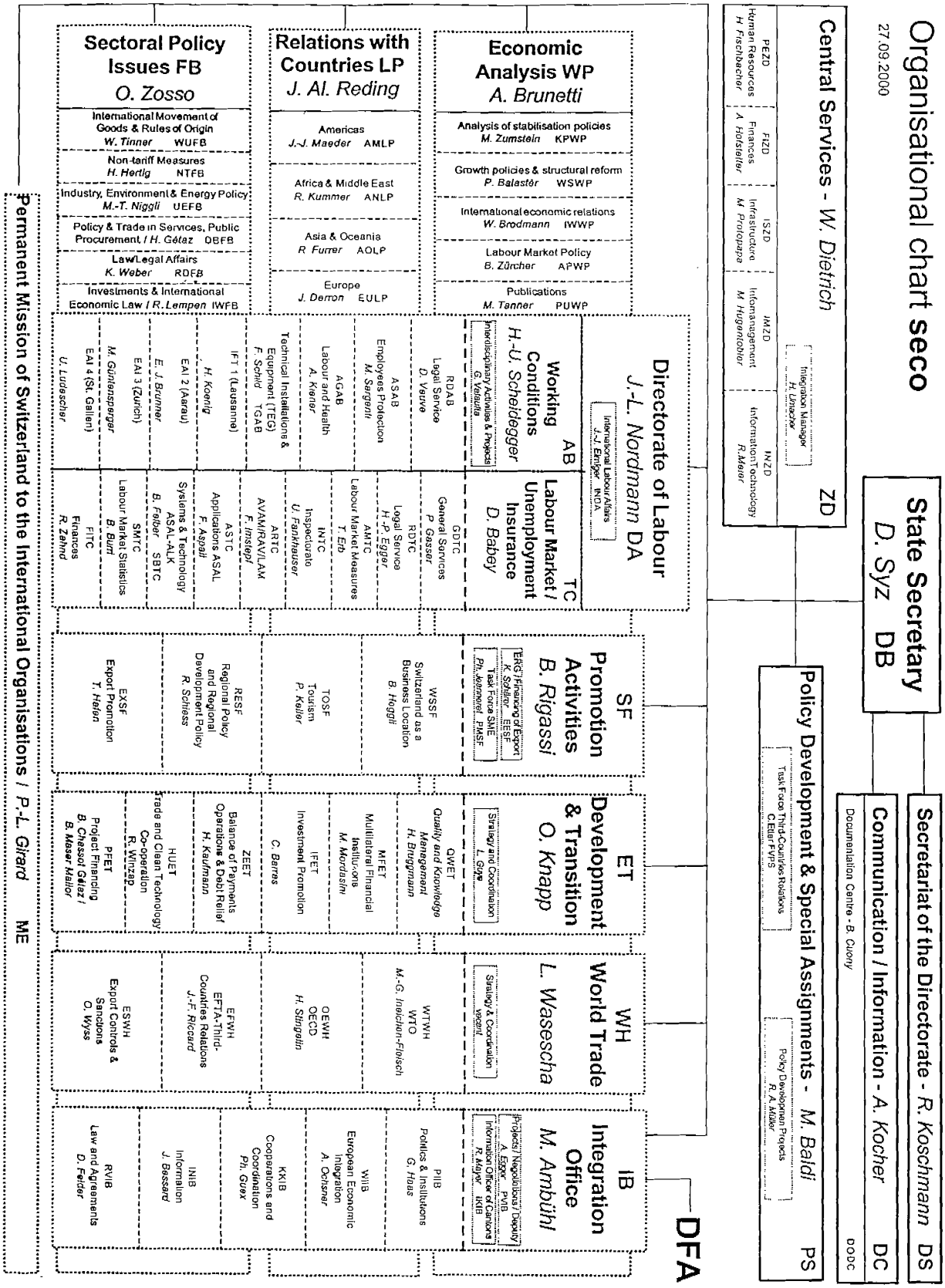
國際紅十字委員會參觀

與瑞士聯邦政府職業安全衛生部官員合影

日內瓦大學醫學中心

與法醫中心教授 DrHarpe 合影

一.瑞士聯邦政府職業安全衛生部所屬 SECO 之組織架構



Annexe
(art. 14, 77, let.

Maladies professionnelles

Liste des substances nocives et des affections dues au travail selon l'article 14 de l'ordonnance

1. Sont réputées substances nocives au sens de l'article 9, 1er alinéa, de l loi, les substances suivantes:

Acétates, seulement acétate de méthyle, d'éthyle, de butyle, d'amyle, de vinyle
Acétone
Acétylène
Acide acétique
Acide azothydrique, ses sels (azotures)
Acide chlorhydrique
Acide chlorosulfonique
Acide formique
Acide nitreux, ses sels (nitrites) et esters
Acide nitrique (acide azotique)
Acide sulfureux et ses sels (sulfites)
Acide sulfurique, ses sels (sulfates) et esters
Acridine
Acroléine
Acrylamide
Additifs pour caoutchouc
Additifs pour huiles minérales
Alcaloïdes
Alcool méthylique (méthanol)
Alcoylamines
Aldéhyle acétique
Amiante, poussières
Ammoniaque
Anhydride acétique
Anhydride maléique
Anhydride phtalique
Anhydride sulfureux (bioxyde de soufre)
Anhydride sulfurique (trioxyde de soufre)
Anthracène
Antimoine et ses composés
Arsenic et ses composés
Arylamines

Barium et ses composés solubles dans les acides dilués
Benzène
Benzines
Béryllium (glucinium), ses composés et alliages
Bitumes
Bois, poussières
Brai de goudron
Brome

Cadmium et ses composés
Carbamate et ses composés
Carbure de calcium
Cétène
Chlorate de potassium
Chlorate de sodium
Chlore
Chlorure d'aluminium
Chlorure de chaux
Chlorure de soufre
Chlorure de sulfuryle
Chlorure de thionyle
Chrome, composés du
Ciment
Cobalt et ses composés
Composés halogénés organiques
Composés nitreux organiques
Cyanogène et ses composés

Diméthylformamide
Dinitrate d'éthylèneglycol
Dioxane
Diazométhane

Essence de thérébentine
Etain, composés de l'
Ethylène-imine

Fluor et ses composés
Formaldéhyde
Formamide

Gaz nitreux
Glycols, leurs éthers et esters
Goudron

Huiles minérales
Hydrate de calcium (chaux éteinte)
Hydrate de potassium (potasse caustique)
Hydrate de sodium (soude caustique)
Hydrazine et ses dérivés
Hydrogène sulfuré
Hydroxylamine

Iode
Isocyanates

Manganèse et ses composés
Mercure, ses composés et amalgames
Méthyléthylcétone

Naphtalène et ses composés
Nickel
Nickel carbonyle
Nitroglycérine

Oxyde de calcium (chaux vive)
Oxyde de carbone (monoxyde)
Oxyde d'éthylène
Oxyde de zinc
Ozone

Paraffine
Peroxydes
Persulfates
Pétrole
Phénol (acide phénique) et ses homologues
Phénylhydroxylamine
Phosgène (oxychlorure de carbone)
Phosphore et ses composés
Platine, sels complexes du
Plomb, ses composés et alliages
Pyridine et ses homologues

Résines époxy (résines de moulage par coulée)

Sélénium et ses composés
Styrène
Sulfures d'alcoyles chlorés
Sulfure de carbone
Sulfure de sodium

Thallium, composés du
Thiocyanates (sulfocyanures)
Toluène
2,4,6-trichloro-1,3,5-triazine (chlorure d'acide cyanurique)

Vanadium et ses composés

Xylènes

2. Sont réputées affectations dues au travail au sens de l'article 9, 1er alinéa, de la loi, les affectations suivantes:

Affections	Travaux
a. Affections dues à des agents physiques	
Ampoules et cassins, crevasses, excoriations, éraflures, durillons	tous travaux
Bursites chroniques par pression constante	tous travaux
Paralysies nerveuses périphériques par pression	tous travaux
«Tendovaginites» *(Peritendinitis crepitans)*	tous travaux
Lésions importantes de l'ouïe	travaux exposant au bruit
Maladies dues au travail dans l'air comprimé	tous travaux
Gelures, à l'exception des engelures	tous travaux
Coup de soleil, insolation, coup de chaleur	tous travaux
Maladies dues aux ultra- et infrasons	tous travaux

二.瑞士聯邦政府職業病種類表

Affections	Travaux
Maladies dues aux vibrations (seulement les actions démontrables au point de vue radiologique sur les os et les articulations, actions sur la circulation périphérique)	tous travaux
Maladies dues aux radiations ionisantes	tous travaux
Maladies dues à des radiations non ionisantes (laser, ondes micro, rayons ultraviolets, rayons infrarouges, etc.)	tous travaux
b. Autres affections:	
Pneumoconioses	travaux dans les poussières d'aluminium, de silicates, de graphite, de silice (quartz), de métaux durs
Affections pulmonaires et bronchiques	travaux dans les poussières de coton, de chanvre, de lin, de céréales, de farine de froment et de seigle, d'enzymes, de moisissures
Epithéliomas de la peau et précancéroses	tous travaux avec des composés, produits et résidus de goudron, brai, bitume, huiles minérales, paraffine
Maladies infectieuses	travaux dans des hôpitaux, des laboratoires, des instituts de recherches et établissements analogues
Maladies transmissibles par contact avec les animaux	garde et soin des animaux; activités exposant au risque de maladie par contact avec des animaux, des parties et des déchets d'animaux et des produits d'origine animale; chargement, déchargement ou transport de marchandises
Amibiase, fièvre jaune, hépatite épidémique, malaria	contractées pendant un séjour professionnel hors de l'Europe

三.國際勞工組織人因工程的資訊手冊

International Occupational Safety and Health Information Centre

Tel. + 41 22 799 67 40
Telex 415 647 ILO CH
Telefax + 41 22 798 62 53

International Labour Office

ILO-CIS CH-1211 GENEVA 22

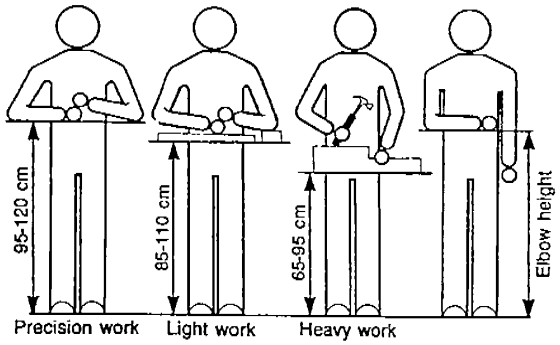
ERGONOMIC INFO-SHEE

ES-A/1 WORKING IN STANDING POSITIONS - STANDING IN THE WORKPLAC

Workplace design should accommodate the variety of workers' shapes and sizes and provide support for the completion of different tasks.

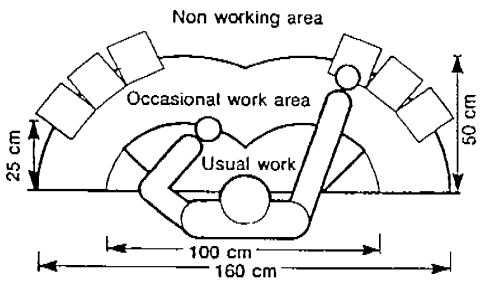
Different tasks require different work surface heights:

- precision work, such as writing or electronic assembly - 5 cm above elbow height; elbow support is needed.
- light work, such as assembly line or mechanical jobs - about 5-10 cm below elbow height.
- heavy work, demanding downward forces - from 20-40 cm below elbow height.

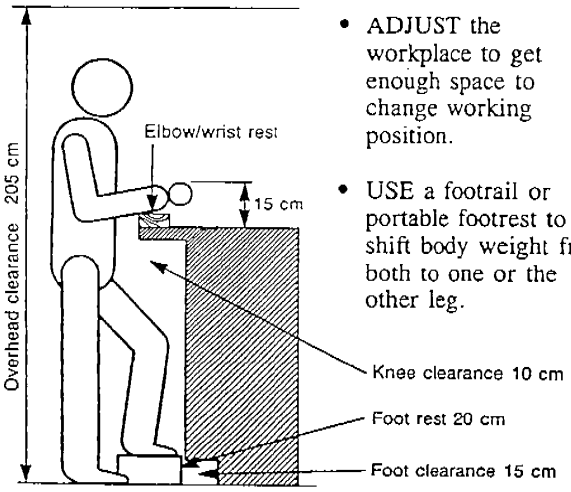


DOs

- ADJUST the height of the work surface according to your dimensions. Use elbow height as the guide.
- ORGANIZE your work so that the usual operations are performed within easy reach.



- FACE the object that you work with at all times.
- KEEP your body close to the work.



- ADJUST the workplace to get enough space to change working position.
- USE a footrail or portable footrest to shift body weight from both to one or the other leg.
- USE a seat whenever possible.
  - while performing your job, or
  - at least occasionally when the work process allows for rest. Refer to ERGONOMIC INFOGRAM No. E-Z02.

DO NOTs

- DO NOT REACH behind the shoulder line. If needed, shift feet to face the object.
- DO NOT OVEREXTEND your reach beyond the point of comfort.
- DO NOT REACH above shoulder height.

This document was originally published by CCOHS (Canadian Centre for Occupational Health and Safety) a
Item:Ergonomic Infogram Series
Further information can be obtained from CIS or its national centres.

International Occupational Safety and Health Information Centre

Tel. + 41 22 799 67 40
Telex 415 647 ILO CH
Telefax + 41 22 798 62 53

International Labour Office

ILO-CIS CH-1211 GENEVA 22

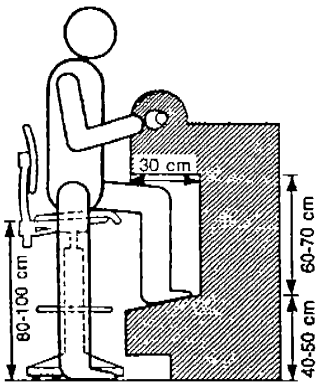
ERGONOMIC INFO-SHEET

ES-A/2 WORKING IN STANDING POSITIONS - SITTING AND STANDING IN THE WORKPLACE

Continuous standing or sitting while working is a common source of discomfort and fatigue.

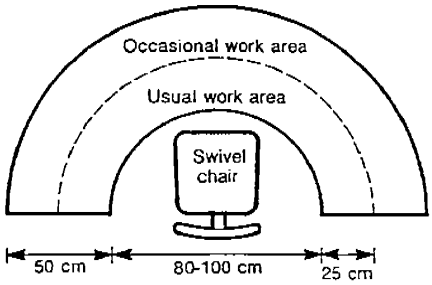
Frequent changes of body positions, including sitting and standing, helps to avoid fatigue.

WORKSTATION FOR SIT/STAND



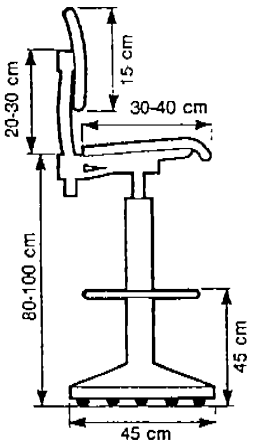
- ADJUST workstation to the proper height. Refer to ERGONOMIC INFOGRAM No. E-A01.
- USE a swivel chair with an adjustable seat height.
- ADJUST the chair seat height to 25-35 cm below the work surface.
- USE a footrest with a height of 40-50 cm.

SEMI-CIRCULAR WORKSTATION



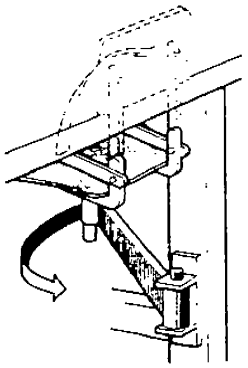
- ARRANGE work in a semi-circle.
- USE a swivel chair:
  - to reduce body twisting
  - to allow easy movements
  - to reduce side-to-side motions.
- USE sloping work tables wherever possible:
  - to reduce bending
  - to encourage an upright position while sitting or standing.

CHAIR FOR SIT/STAND WORKSTATION

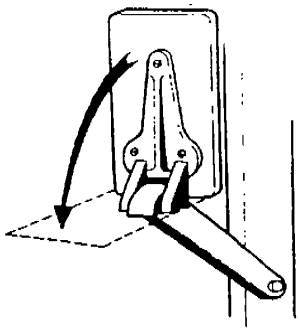


- ENSURE that the seat has a minimum width of 40 cm.
- CHOOSE back rests that are contoured vertically and horizontally.
- USE a seat covering made of non-slip, breathable fabric.
- SELECT a seat padding from 2-3 cm thick.

Wherever possible, a worker should be able to work sitting or standing at will.



- PROVIDE a chair that can fold up and be out of the way where space is limited.
- ENSURE that chairs have a back support.



- PROVIDE a chair for resting purposes even when work can only be done standing.

This document was originally published by CCOHS (Canadian Centre for Occupational Health and Safety) a item: **Ergonomic Infogram Series**
Further information can be obtained from CIS or its national centres.

International Occupational Safety and Health Information Centre

Tel. + 41 22 799 67 40
Telex 415 647 ILO CH
Telefax + 41 22 798 62 53

International Labour Office

ILO-CIS CH-1211 GENEVA 22

ERGONOMIC INFO-SHEE

ES-A/3 WORKING IN STANDING POSITIONS - FOOTWEAR AND FLOOR

FOOTWEAR

Your feet can only be as comfortable as the footwear permits.

- WEAR shoes that do not change the shape of your foot.

- CHOOSE shoes that provide a firm grip for the heel. If the back of the shoe is too wide or too soft the foot will slip, causing instability and soreness.
- WEAR shoes that allow freedom to move your toes. Pain and fatigue result if shoes are too narrow or too shallow.
- ENSURE shoes have arch supports. Lack of arch support causes flattening of the foot.
- WEAR shoes with lace-up fastenings.
- TIGHTEN the lace instep of your footwear firmly. This prevents the foot from slipping inside the footwear.
- USE padding under the tongue if you suffer from tenderness over the bones at the top of the foot.
- USE a shock-absorbing cushioned insole when working on metal or cement floors.
- DO NOT WEAR flat shoes.
- DO NOT WEAR shoes with heels higher than 5 cm (2 inches).
- CHOOSE footwear according to the hazard at your workplace.
- SELECT safety footwear, if required, that is CSA approved and carries the proper ratings for the hazard. Refer to SAFETY INFOGRAM K03.
- SELECT footwear taking into account individual fit and comfort. Try on and walk in before using.

FLOORS

- KEEP work areas clean.
- AVOID standing on concrete or metal floors. Recommended for standing work are wooden, cork or rubber covered floors.
- ENSURE that the floors are level and non-slippery.
- COVER concrete or metal floors with mats. Slanted edges on mats help prevent tripping.
- DO NOT USE thick foam-rubber mats. Too much cushioning can cause fatigue and increase the hazard of tripping.

This document was originally published by CCOHS (Canadian Centre for Occupational Health and Safety)
Item:Ergonomic Infogram Series
Further information can be obtained from CIS or its national centres.

International Occupational
Safety and Health
Information Centre

Tel. + 41 22 799 67 40
Telex 415 647 ILO CH
Telefax + 41 22 798 62 53

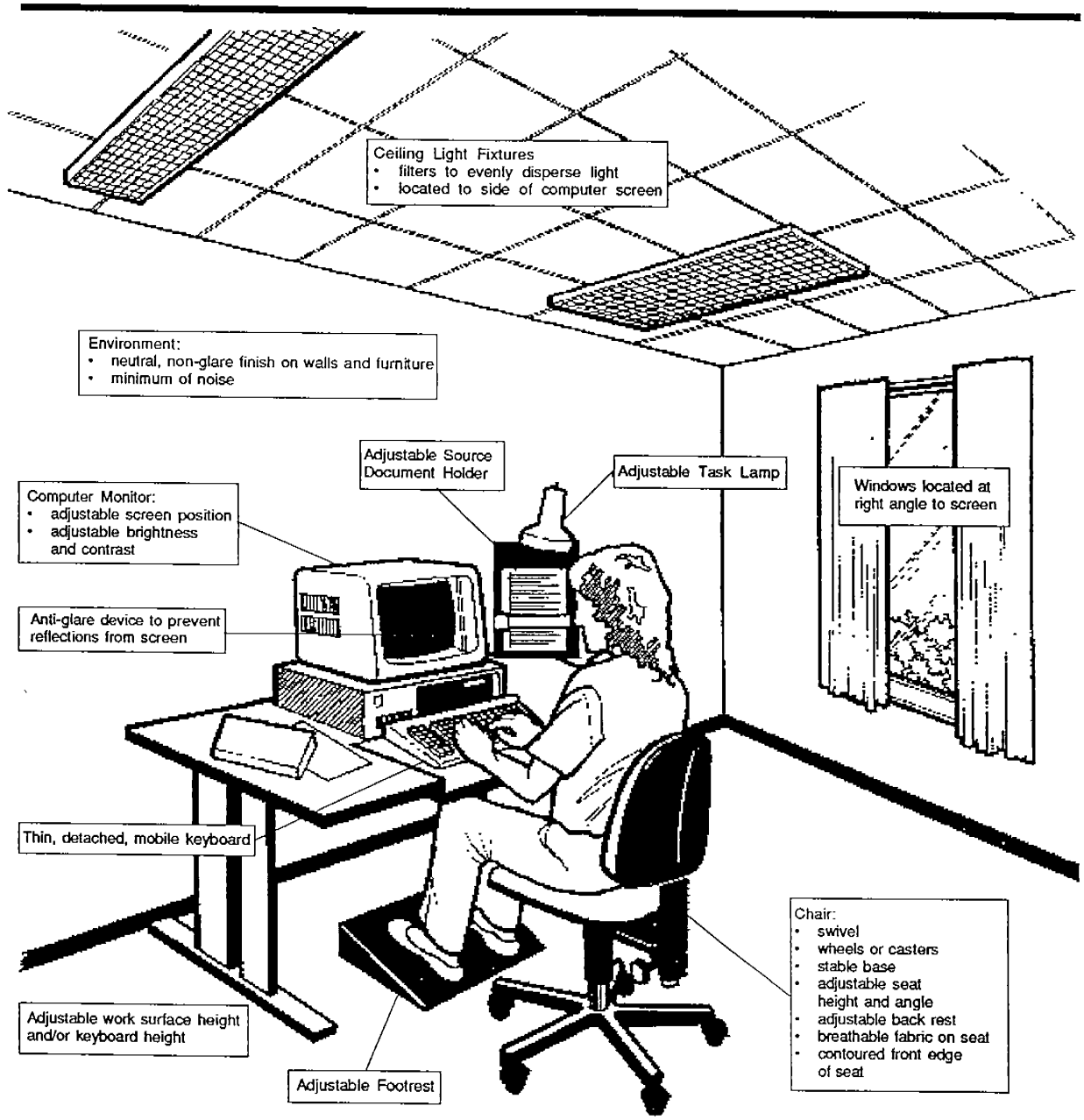
International
Labour
Office

ILO-CIS CH-1211 GENEVA 22

ERGONOMIC INFO-SHEET

ES-B/1

VDT WORKPLACE



This document was originally published by CCOHS (Canadian Centre for Occupational Health and Safety) in its **Ergonomic Infogram series**
Further information can be obtained from CIS or its national centres.

International Occupational Safety and Health Information Centre

Tel. + 41 22 799 67 40
Telex 415 647 ILO CH
Telefax + 41 22 798 62 53

International Labour Office

ILO-CIS CH-1211 GENEVA 22

ERGONOMIC INFO-SHEET

ES-B/2 CHECKLIST

VDT workplaces must be flexible enough to accommodate the various individuals using them.

Use this checklist to identify problems in a VDT workplace.

"NO" answers indicate a potential problem and should be followed up. They may indicate the need for adjustment or changes in the workplace or job design.

VDTS

___ Top surface of the keyboard space bar (or bottom row of keys) is no higher than 6.5 cm (2.5 in.) above the work surface.

___ During keyboard use, the forearm and upper arm form an angle of 80°-100°, with the upper arm almost vertical. The wrist is relaxed and not bent. Wrist rests are available.

___ If used primarily for text entry, keyboard is directly in front of the operator.

___ If used primarily for data entry, keyboard is directly in front of the keying hand.

___ Keyboard is detached and moveable.

___ Top of the screen is about eye level.

___ Viewing distance is 30 to 60 cm (12 to 24 in.).

___ Screen is free of glare or shadows.

___ Images on the screen are sharp, easy to read and do not flicker.

Chair

___ Chair has wheels or castors suitable for the floor surface.

___ Chair swivels.

___ Backrest is adjustable for both height and angle.

___ Backrest supports the inward curve of the lower back.

___ Chair height is appropriate for the individual and the work surface height. Refer to ERGONOMIC INFOGRAM E-B04.

___ Chair is adjusted so there is no pressure on the backs of the legs, and feet are flat on the floor or on a foot rest.

___ Chair is adjustable from the sitting position.

___ Chair upholstery is a breathable fabric.

___ Footrests are used if feet do not rest flat on the floor.

Work Surface

___ Work surface height is adjustable.

___ Leg room is sufficient to change position of legs without getting up.

___ Work surface is large enough to hold work materials.

___ Commonly used items are close to and in front of the operator.

___ Infrequently used items are stored.

Visual Environment

___ Lighting does not produce glare or shadows on the screen.
___ Lighting allows workers to easily read characters on the screen and source document.

___ Wall colour is neutral and not too bright.

___ Shiny surfaces and objects are covered or removed.
___ Windows have blinds or curtains to prevent glare.
___ VDTs are located away from windows, or screens are at a 90° angle to windows.

___ Ceiling fluorescent lights are oriented lengthwise to the sides of the VDT.

___ Room lighting is uniform and slightly dimmer than usual office lighting.

___ General work areas have indirect or diffuse lighting.

___ Ceiling fluorescent lights are fitted with diffusers or parabolic louvres.

___ Adjustable task lights are available over source documents.

This document was originally published by CCOHS (Canadian Centre for Occupational Health and Safety) in its **Ergonomic Infogram series**
Further information can be obtained from CIS or its national centres.

International Occupational Safety and Health Information Centre

Tel. + 41 22 799 67 40
Telex 415 647 ILO CH
Telefax + 41 22 798 62 53

International Labour Office

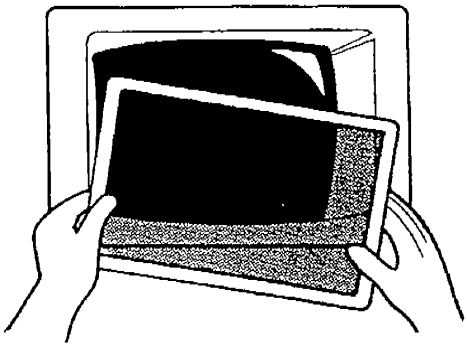
ILO-CIS CH-1211 GENEVA 22

ERGONOMIC INFO-SHEET

ES-B/3 VDTs

VDTs come with various features that are built in or that can be added. Use the adjustments provided.

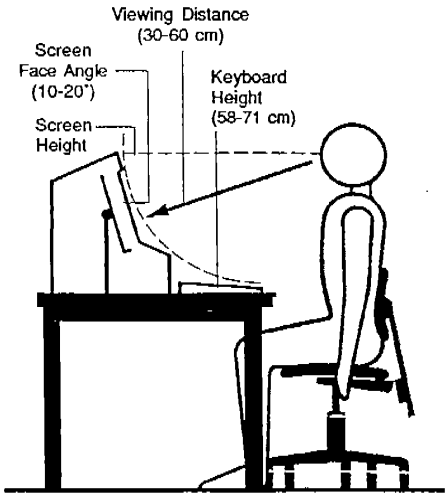
ELIMINATE glare caused by lights, windows or bright objects. If reflections can still be seen on the screen, use a mesh filter or anti-glare spray. Follow the manufacturer's instructions. Refer to ERGONOMIC INFOGRAME-B05.



ADJUST screen brightness and contrast. It is easier to read from the screen if characters are brighter than the background. Be careful not to make characters too bright.

ADJUST the screen height so the top is just about eye level.

TILT the screen slightly backwards. Watch that this does not create glare on the screen.

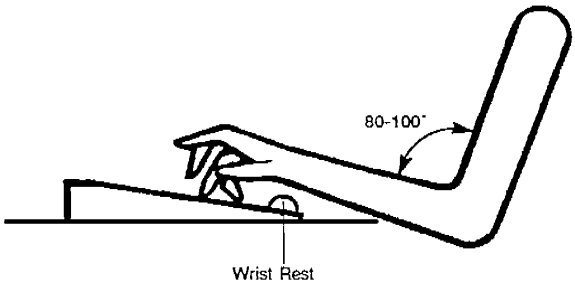


ADJUST chair, work surface and keyboard heights properly. Refer to ERGONOMIC INFOGRAME-B04.

POSITION keyboard for two-handed "typing" directly in front of operator. Position keyboard for one-handed data entry in front of keying hand. Leave a large area free for source documents and other work materials.

MOVE the keyboard occasionally to change the arm and shoulder position.

USE a wrist rest if the heel of the hand or wrist is not supported.



USE an adjustable document holder. Place it next to the screen and at the same height. The head will have to turn less and eyes will adjust more easily. Refer to ERGONOMIC INFOGRAME-B01.

ALTERNATE position of document holder on either side of VDT to change head position.

CONNECT keyboard to VDT with a cord that is at least 70 cm (28 in.) long.

CHECK for excessive noise from the VDT or printer.

CLEAN the VDT screen regularly. Follow the manufacturer's instructions.

REPORT problems with VDT controls, flicker or excessive noise.

This document was originally published by CCOHS (Canadian Centre for Occupational Health and Safety) in its **Ergonomic Infogram series**
Further information can be obtained from CIS or its national centres.

International Occupational Safety and Health Information Centre

Tel. + 41 22 799 67 40
Telex 415 647 ILO CH
Telefax + 41 22 798 62 53

International Labour Office

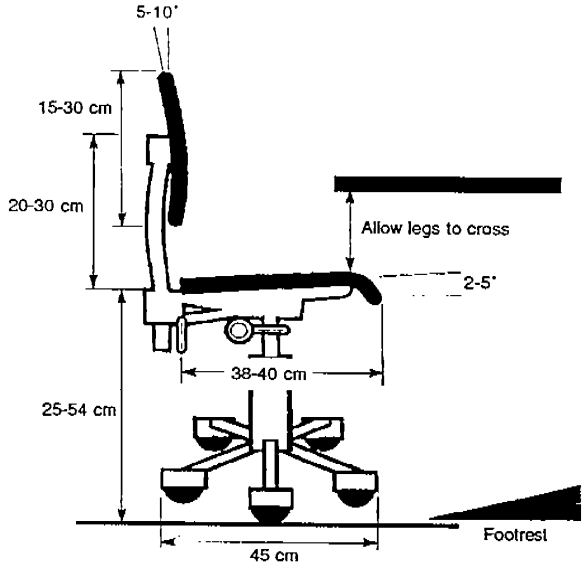
ILO-CIS CH-1211 GENEVA 22

ERGONOMIC INFO-SHEET

ES-B/4

CHAIR AND WORK SURFACE

Well-adjusted chairs improve body position and blood circulation, reduce muscular effort, and decrease pressure on the worker's back. Chairs should swivel, have five wheels for stability, have a breathable fabric on the seat, and have a rounded front edge.



TIGHTEN the chair backrest so that it does not give way with body weight.

READJUST the chair throughout the day to vary body position.

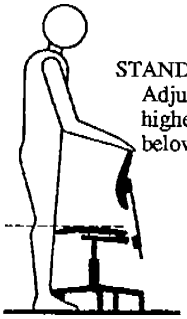
USE only chairs with arms that do not interfere with the work surface.

CHECK that there is enough leg room under work surface. Do not store materials under work surface.

CHECK that the work surface is large enough to hold work materials.

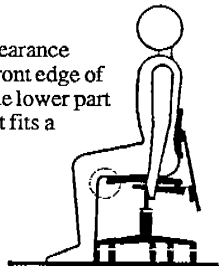
STORE items not used frequently.

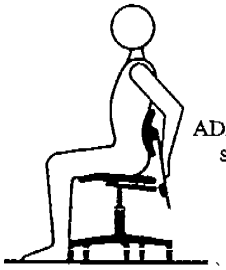
Adjustable work surfaces provide the most flexibility and accommodate the largest number of users. Adjust chair according to body size, then adjust work surface or keyboard height.



STAND in front of the chair. Adjust the height so that the highest point of the seat is just below the knee cap.

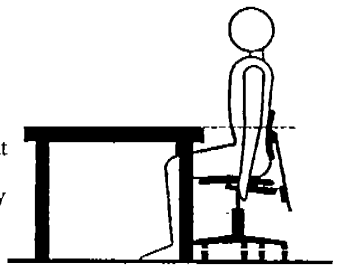
SIT so that the clearance between the front edge of the seat and the lower part of the legs just fits a clenched fist.





ADJUST the backrest of the chair so that it supports the hollow in the lower back.

ADJUST work surface to about the height of elbows with the arms hanging straight by the sides.



If temporarily using an unadjustable work surface:

ADJUST seat height so that elbows are about the same height as the home row on the keyboard.

USE a footrest if there is pressure on the back of the legs or if the feet are not resting flat on the floor. The footrest should support the whole foot and be adjustable.

This document was originally published by CCOHS (Canadian Centre for Occupational Health and Safety) in its **Ergonomic Infogram series**
Further information can be obtained from CIS or its national centres.

International Occupational Safety and Health Information Centre

Tel. + 41 22 799 67 40
Telex 415 647 ILO CH
Telefax + 41 22 798 62 53

International Labour Office

ILO-CIS CH-1211 GENEVA 22

ERGONOMIC INFO-SHEET

ES-B/5

VISUAL ENVIRONMENT

Reflections from light fixtures, windows, or shiny objects cause glare. Too little light or poorly placed light fixtures cause shadows on the VDT screen.

Glare and shadows cause eyestrain and fatigue. If the operator has to adopt an awkward position to see around glare and shadows, the strain can cause neck, shoulder and back pain.

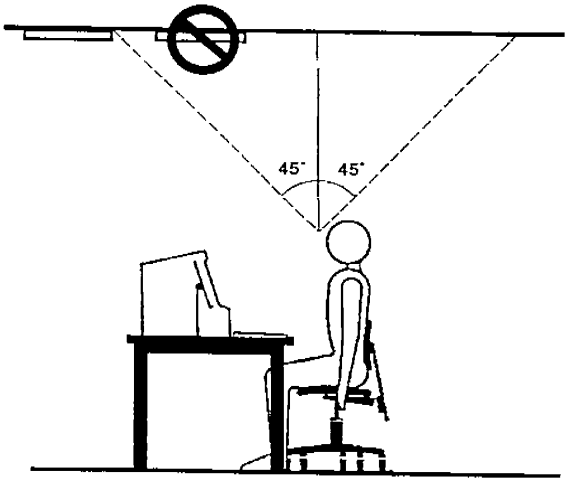
Lighting must be balanced. It must be bright enough for the operator to read source documents. It should not be so bright that it makes it hard to read from the screen. The recommended lighting level is 300 to 500 lux.

DOs

CHECK for reflections or bright spots on the VDT screen. Eliminate the source.

USE grid or parabolic filters on fluorescent fixtures to evenly disperse light. Refer to ERGONOMIC INFOGRAM E-B01.

POSITION VDT with ceiling light fixtures to the sides of the screen or at least outside of the glare zone. Refer to ERGONOMIC INFOGRAM E-B01.



POSITION VDT screen at 90° angle to windows. Refer to ERGONOMIC INFOGRAM E-B01.

ADJUST window blinds or drapes to control light levels and glare.

USE non-glare finishes and neutral colours on walls, furniture and VDT equipment.

USE glare screen or filter on VDT screen if glare cannot be eliminated at the source. Refer to ERGONOMIC INFOGRAM E-B03.

USE task lights to eliminate shadows over source documents.

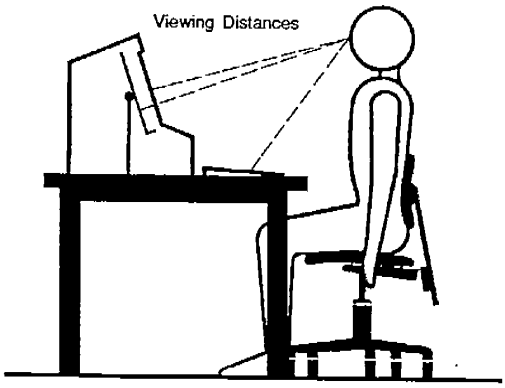
MOVE or cover shiny objects.

CHECK for flicker from fluorescent lights. Replace fluorescent tubes regularly and properly maintain fixtures.

CHECK for flicker from VDT screen.

LOOK away frequently from the VDT to rest the eyes.

ENSURE correction of vision problems by having regular eye examinations. Tell the eye examiner about VDT use and the viewing distances. Viewing distances and angles may influence the choice of lenses.



DO NOTs

DO NOT HANG glossy pictures behind VDT screen.

DO NOT USE shiny or glossy desk blotters.

DO NOT FACE windows or have VDT screen facing windows.

This document was originally published by CCOHS (Canadian Centre for Occupational Health and Safety) in its **Ergonomic Infogram series**
Further information can be obtained from CIS or its national centres.

International Occupational Safety and Health Information Centre

Tel. + 41 22 799 67 40
Telex 415 647 ILO CH
Telefax + 41 22 798 62 53

International Labour Office

ILO-CIS CH-1211 GENEVA 22

ERGONOMIC INFO-SHEE

ES-B/6 JOB DESIGN

No matter how well designed a workplace is, health and safety problems arise if little attention is paid to how work is done. VDT work often involves repetitive movements of the hands and few changes in body position. This can lead to muscle pain and strain.

VARY work tasks. Break up VDT work by doing non-VDT tasks that place different demands on the body by changing body position.

WORK at a reasonable rate. Too fast a work pace contributes to muscle strain. Too slow a work pace contributes to boredom.

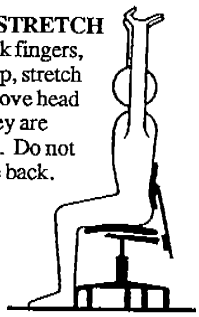
LOOK away from the screen occasionally and focus on a distant object to rest the eyes.

TAKE regular rest breaks to ease muscle aches, eye strain and stress.

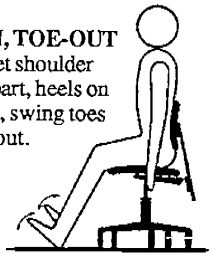
USE rest breaks to stand up, move around and change mental activity.

RELAX muscles, stretch and change position. Exercises done at the VDT help.

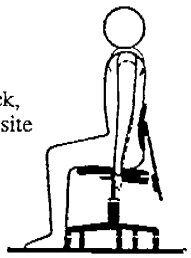
TALL STRETCH
Interlock fingers, palms up, stretch arms above head until they are straight. Do not arch the back.

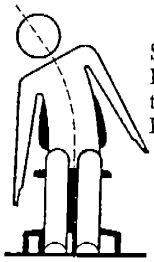


TOE-IN, TOE-OUT
Place feet shoulder width apart, heels on the floor, swing toes in, then out.



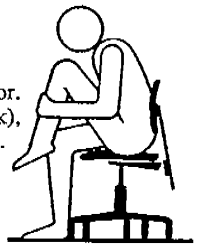
SHOULDER ROLL
Roll the shoulders—raise them, pull them back, then drop them and relax. Repeat in the opposite direction.



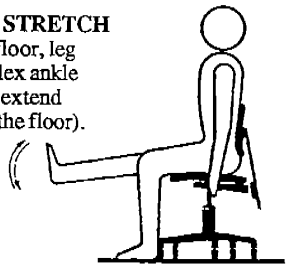


SIDE STRETCH
Drop left shoulder, reaching left hand towards the floor. Return to starting position. Repeat on right side.

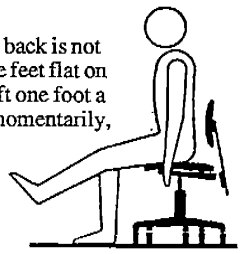
BACK CURL
Grasp shin. Lift leg off the floor. Bend forward (curling the back), reaching nose toward the knee.



ANKLE FLEX AND STRETCH
Hold one foot off the floor, leg straight. Alternately flex ankle (pointing toes up) and extend (pointing toes toward the floor). Repeat with the other leg.



LEG LIFT
Sit forward on the chair so your back is not touching the chair's back. Place feet flat on the floor. With a straight leg, lift one foot a few inches off the floor. Hold momentarily, return it to the floor and repeat with the other leg.



PALMING *(not shown)*
Without pressing on eyeballs, cover eyes with palms. Close eyes. Breathe deeply 8 or 9 times. Uncover eyes after a few seconds. Open by fluttering them and blinking.

This document was originally published by CCOHS (Canadian Centre for Occupational Health and Safety) in its **Ergonomic Infogram series**
Further information can be obtained from CIS or its national centres.

International Occupational Safety and Health Information Centre

Tel. + 41 22 799 67 40
Telex 415 647 ILO CH
Telefax + 41 22 798 62 53

International Labour Office

ILO-CIS CH-1211 GENEVA 22

ERGONOMIC INFO-SHEET

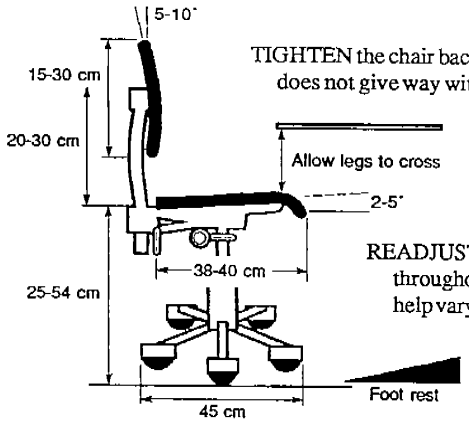
ES-D/1

CHAIR AND WORK SURFACE

CHAIR

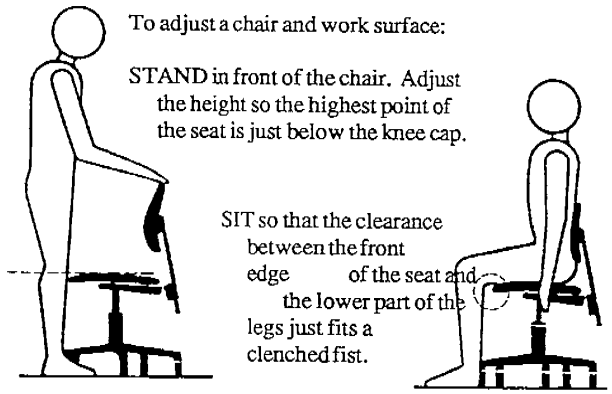
CHOOSE a chair with:

- a backrest which is shaped to support the lower back
- a seat height which does not put pressure on back of thighs or knees
- a seat that curves downwards at the front edge
- a stable base
- a swivel mechanism
- arm rests which do not prevent the chair from being drawn up to the work surface or interfere with natural movement
- breathable fabric on the seat
- controls that can be used while seated



TIGHTEN the chair backrest so that it does not give way with body weight.

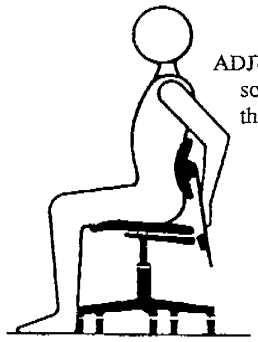
READJUST the chair throughout the day to help vary body position.



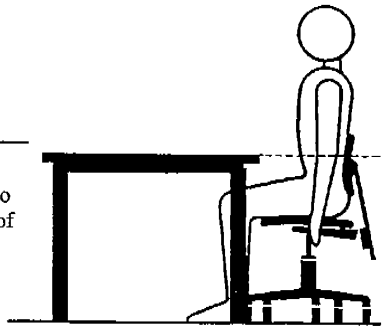
To adjust a chair and work surface:

STAND in front of the chair. Adjust the height so the highest point of the seat is just below the knee cap.

SIT so that the clearance between the front edge of the seat and the lower part of the legs just fits a clenched fist.



ADJUST the backrest of the chair so that it supports the hollow of the lower back.



ADJUST work surface to about the height of elbows with the arms hanging straight by the sides.

If using a fixed height work surface, raise the chair to get the proper arm and upper body position:

ADJUST chair height so elbows are about the same height as the work surface.

USE a footrest if the feet cannot rest flat on the floor or if there is pressure on the back of the legs. The footrest should be adjustable and support the whole foot.

WORK SURFACE

MAKE adjustments so work surface is at the correct working height.

ENSURE that work surface is large enough to hold materials.

AVOID cramping legs under work surface.

DO NOT STORE materials under work surface.

AVOID over-reaching and twisting.

This document was originally published by CCOHS (Canadian Centre for Occupational Health and Safety) in its **Ergonomic Infogram series**
Further information can be obtained from CIS or its national centres.

International Occupational Safety and Health Information Centre

Tel. + 41 22 799 67 40
Telex 415 647 ILO CH
Telefax + 41 22 798 62 53

International Labour Office

ILO-CIS CH-1211 GENEVA 22

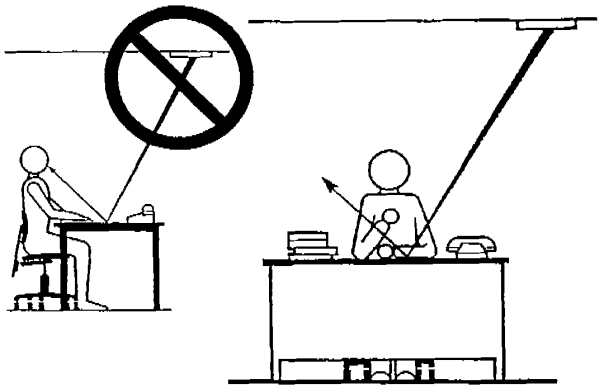
ERGONOMIC INFO-SHEET

ES-D/2 VISUAL ENVIRONMENT

IDENTIFY sources of glare. Place a mirror on the desk and look for images. Bare light bulbs or bright lights reflected in the mirror cause glare.

POSITION desk with window to the side of the worker.

POSITION desk so that ceiling lights are to the sides. Avoid placing desk where light fixtures are directly in front.

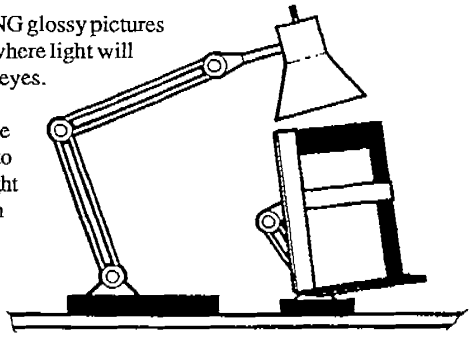


ADJUST window blinds or drapes to control light levels and glare.

USE non-glare finishes and neutral colours on walls and furniture. The colour and finish of a surface determines how much light it reflects.

DO NOT HANG glossy pictures or objects where light will reflect into eyes.

USE adjustable task lights to increase light levels when needed.



USE indirect lighting to eliminate shadows.

CHECK fluorescent lights for flicker. Replace fluorescent tubes regularly and maintain fixtures properly.

LOOK up and away from work frequently to rest the eyes.

WORK from good, clear copy. Higher light levels are required for poor copy.

ENSURE that storerooms, corridors and stairways are well lit.

Appropriate light levels depend on visual preferences and type of work. In the following chart, the higher ranges are for workers with poorer vision and for work requiring high speed or accuracy.

LOCATION	LIGHT LEVEL (LUX)
Corridors	50-150
Stairs	100-200
Coat Rooms	100-200
Stock Rooms	200-400
Traditional Office Tasks	500-750
Conference Rooms	300-750
Drawing Offices	500-1000

Check with the occupational health and safety agency or department in your jurisdiction for regulations regarding light levels.

This document was originally published by CCOHS (Canadian Centre for Occupational Health and Safety) in its **Ergonomic Infogram series**
Further information can be obtained from CIS or its national centres.

International Occupational Safety and Health Information Centre

Tel. + 41 22 799 67 40
Telex 415 647 ILO CH
Telefax + 41 22 798 62 53

International Labour Office

ILO-CIS CH-1211 GENEVA 22

ERGONOMIC INFO-SHEET

ES-D/3

TEMPERATURE, HUMIDITY AND NOISE

TEMPERATURE AND HUMIDITY

Temperature and humidity together affect comfort.

Optimum office temperature is 20-24°C (70-75°F).

Optimum office humidity is between 30 and 60%.

Office ventilation systems are complex. Generally, building maintenance engineers maintain them.

USE portable heaters only if the proper authority approves them. Heaters are a potential fire hazard.

DO NOT USE heaters that produce toxic fumes.

USE only heaters with thermostats.

PLACE heaters or fans so that they do not blow air directly on workers.

KEEP heaters away from combustibles and curtains.

PLACE fans so that they do not vibrate and fall off surfaces.

UNPLUG heaters and fans and wait for blades to stop before moving them.

USE window curtains or blinds to increase or decrease heat from the sun.

USE reflective coating or tinting on windows to decrease heat from the sun.

CONSIDER impact on ventilation before rearranging office equipment or furniture.

WEAR clothing appropriate for the office conditions.

ENSURE that ventilation systems, dehumidifiers and humidifiers are properly cleaned and maintained.

NOISE

Office noise disturbs and distracts workers.

SELECT quiet equipment.

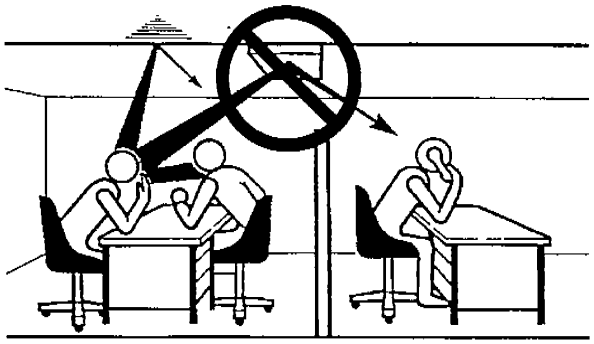
ENSURE that equipment is well maintained.

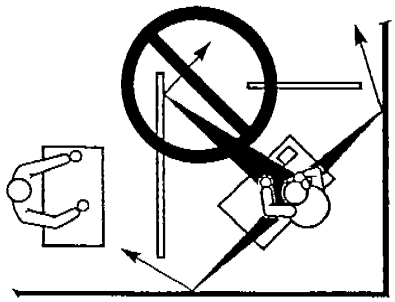
ISOLATE noisy equipment from general work areas.

USE noise hoods over noisy equipment.

USE sound-absorbing materials such as carpeting, curtains, acoustic baffles and typewriter pads.

CHOOSE and position acoustic screens carefully. The position of light fixtures, walls and desks can change noise levels.





USE conference rooms for conversations that could distract other workers.

SCHEDULE noisy tasks when they least effect others.

This document was originally published by CCOHS (Canadian Centre for Occupational Health and Safety) in its **Ergonomic Infogram series**
Further information can be obtained from CIS or its national centres.

International Occupational Safety and Health Information Centre

Tel. + 41 22 799 67 40
Telex 415 647 ILO CH
Telefax + 41 22 798 62 53

International Labour Office

ILO-CIS CH-1211 GENEVA 22

ERGONOMIC INFO-SHEET

ES-D/4 SAFETY

Most office accidents result from slips, trips and falls, lifting objects, being caught in or between things, and punctures or cuts.

FILING CABINETS

CLOSE cabinet drawers when not in use.

DO NOT OPEN more than one drawer at a time.

PLACE cabinets so that drawers do not open into aisles.

LOAD cabinets starting from the bottom for stability.

SECURE cabinets to wall or floor.

USE handles to close drawers to avoid catching fingers.

AVOID overfilling cabinets to prevent paper and staple cuts.

DO NOT KEEP heavy objects on top of tall filing cabinets.

FLOORS AND STAIRS

CLEAN up spills and tracked-in rain or snow.

PICK objects up off the floor. Even paper, pencils and rubberbands can cause trips and falls.

USE slip-resistant preparations on linoleum, tile, or other polished floor surfaces.

SECURE carpets and rugs.

USE handrails on stairs.

REMOVE stairway distractions such as mirrors, decorations or posters.

WALK on the right.

DO NOT RUN, especially near corners.

INSTALL mirrors at blind, busy corners.

DO NOT STORE boxes, equipment or supplies outside doorways or in aisles.

DO NOT CARRY loads that obstruct vision.

DO NOT PARTICIPATE in horseplay.

OFFICE EQUIPMENT

USE fingertip guards when handling paper.

STORE pencils and pens point down or flat in drawers.

SHEATH scissors, letter openers, razor blades or other sharp tools before storing.

USE paper cutter safely:
- Keep knife blade in locked position.
- Use proper guards.
- Maintain firm grip on blade handle.
- Do not cut too many papers at once.

USE a staple remover to remove staples.

FILE sharp edges off metal furniture.

USE a proper ladder or step stool to reach high places. Do not use a box, desk or rolling chair.

OFFICE MACHINES

KEEP long hair, fingers and jewellery away from moving machinery.

USE proper guards on machines.

OBSERVE directions and cautions when adjusting machinery.

CALL service for repairs.

DISCONNECT and report frayed electrical cords or plugs.

UNPLUG equipment when not in use or before making adjustments.

FIRE SAFETY

DISPOSE of cigarette, cigar or pipe ashes properly.

USE nonflammable waste baskets.

STORE oily or solvent-soaked rags in fireproof containers.

KNOW evacuation procedures and the location of exits.

KNOW the location and classes of fire extinguishers and how to use them.

An office worker entering a plant or factory MUST wear the appropriate personal protective equipment and observe proper safety procedures.

This document was originally published by CCOHS (Canadian Centre for Occupational Health and Safety) in its **Ergonomic Infogram series**
Further information can be obtained from CIS or its national centres.

International Occupational Safety and Health Information Centre

Tel. + 41 22 799 67 40
Telex 415 647 ILO CH
Telefax + 41 22 798 62 53

International Labour Office

ILO-CIS CH-1211 GENEVA 22

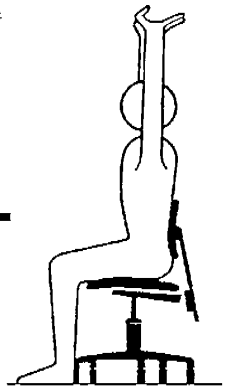
ERGONOMIC INFO-SHEET

ES-D/5

EXERCISES TO DO IN THE OFFICE

Many office workers have jobs where they sit or stand for long periods. Working in one position can lead to muscle pain and strain.

Exercises done at the desk can help.

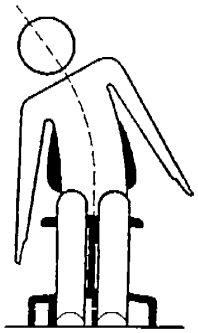


TALL STRETCH

Interlock fingers, palms up. Stretch arms above the head until they are straight. Do not arch the back.

SIDE STRETCH

Drop left shoulder, reaching left hand towards the floor. Return to starting position. Repeat on right side.

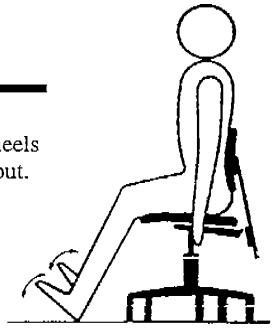


BACK CURL

Grasp shin, lift leg off the floor. Bend forward (curling the back), reaching nose toward the knee.

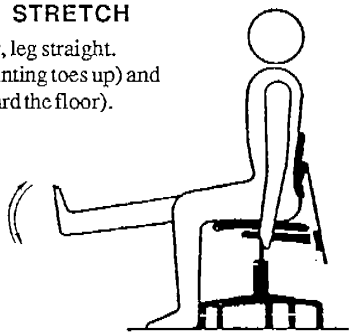
TOE-IN, TOE-OUT

Place feet shoulder-width apart, heels on the floor. Swing toes in, then out.



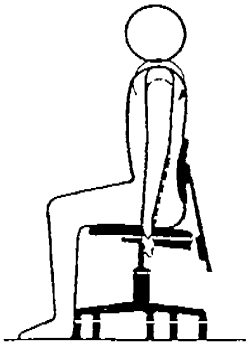
ANKLE FLEX AND STRETCH

Hold one foot off the floor, leg straight. Alternately flex ankle (pointing toes up) and extend (pointing toes toward the floor). Repeat with the other leg.



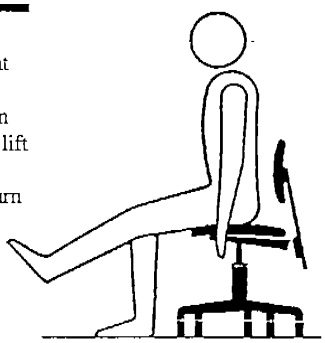
SHOULDER ROLL

Roll the shoulders—raise them, pull them back, then drop them and relax. Repeat in the opposite direction.



LEG LIFT

Sit forward on the chair so that your back is not touching the chair's back. Place feet flat on the floor. With a straight leg, lift one foot a few inches off the floor. Hold momentarily, return it to the floor and repeat with the other leg.



This document was originally published by CCOHS (Canadian Centre for Occupational Health and Safety) in its **Ergonomic Infogram series**
Further information can be obtained from CIS or its national centres.