

General Overview of Construction Industry Health and Safety Issues

Anders Englund, MD

Dep Public Health and Clinical Medicine, Umeå
University







Characteristics for the construction industry

- **WORKSITE:**

- Non permanent
- Changing location
- Changing hazards as project proceeds

- **EMPLOYEES:**

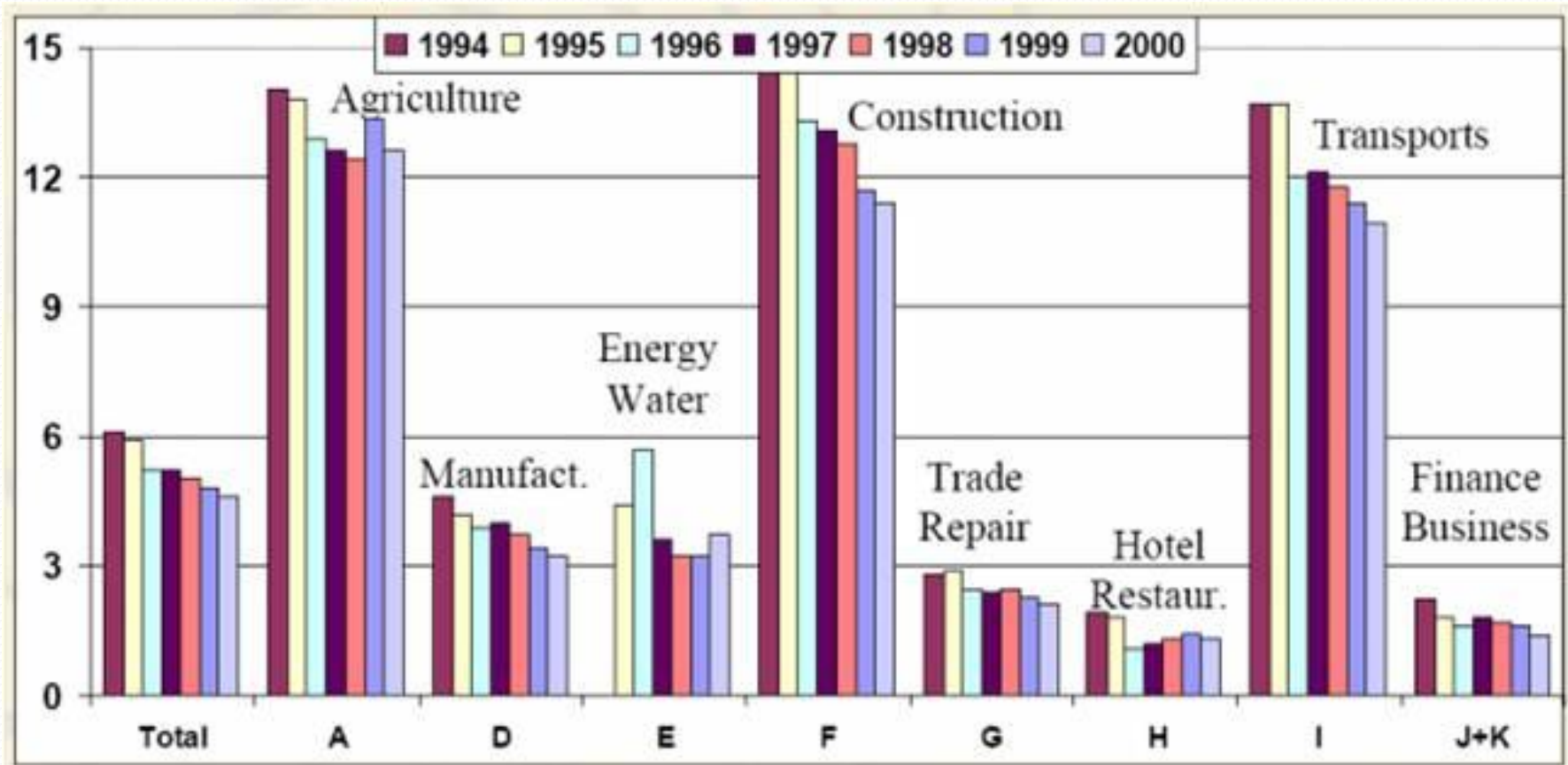
- Short term, non permanent affiliated
- Changing employer as new project starts

Areas for prevention

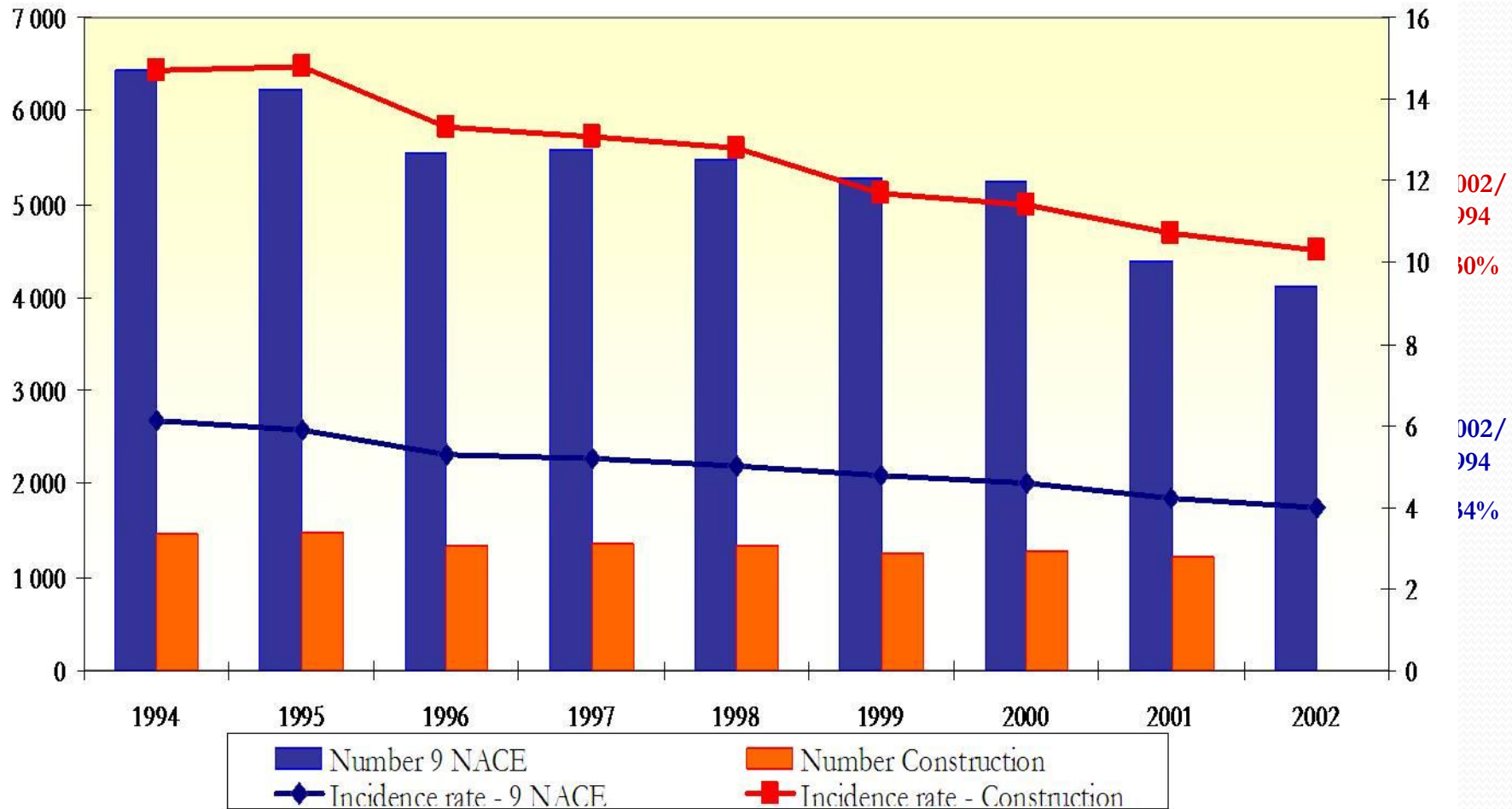
- **Accident** prevention
- Prevention in the field of **ergonomics**
- Prevention in the field of **chemical hazards**

Fatal accidents at work, EU15

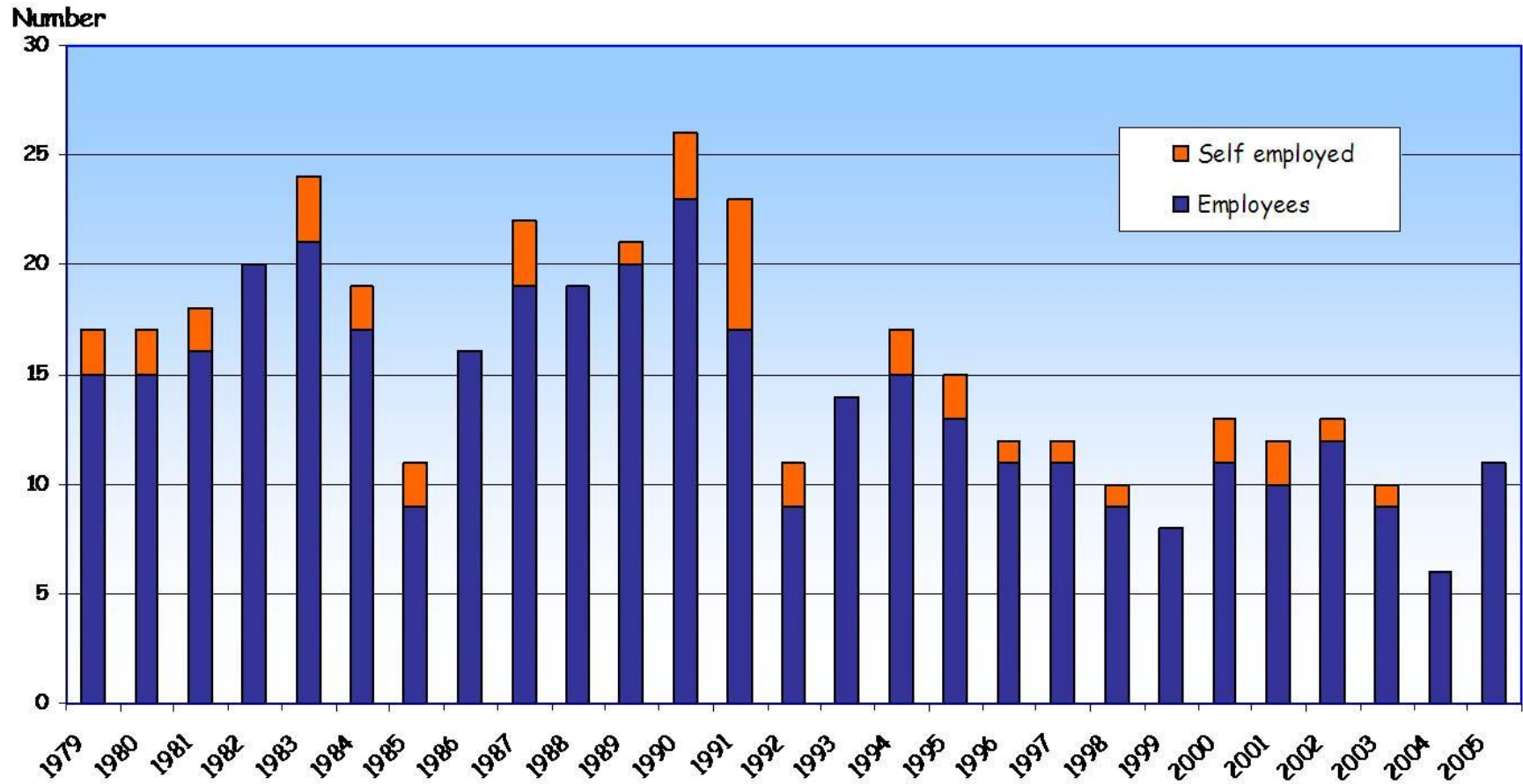
Incidence rate by economic activity per 100 000 workers



Number of Fatal accidents at work, 9 main branches and Construction in Eu15 and Incidence rate per 100 000 workers

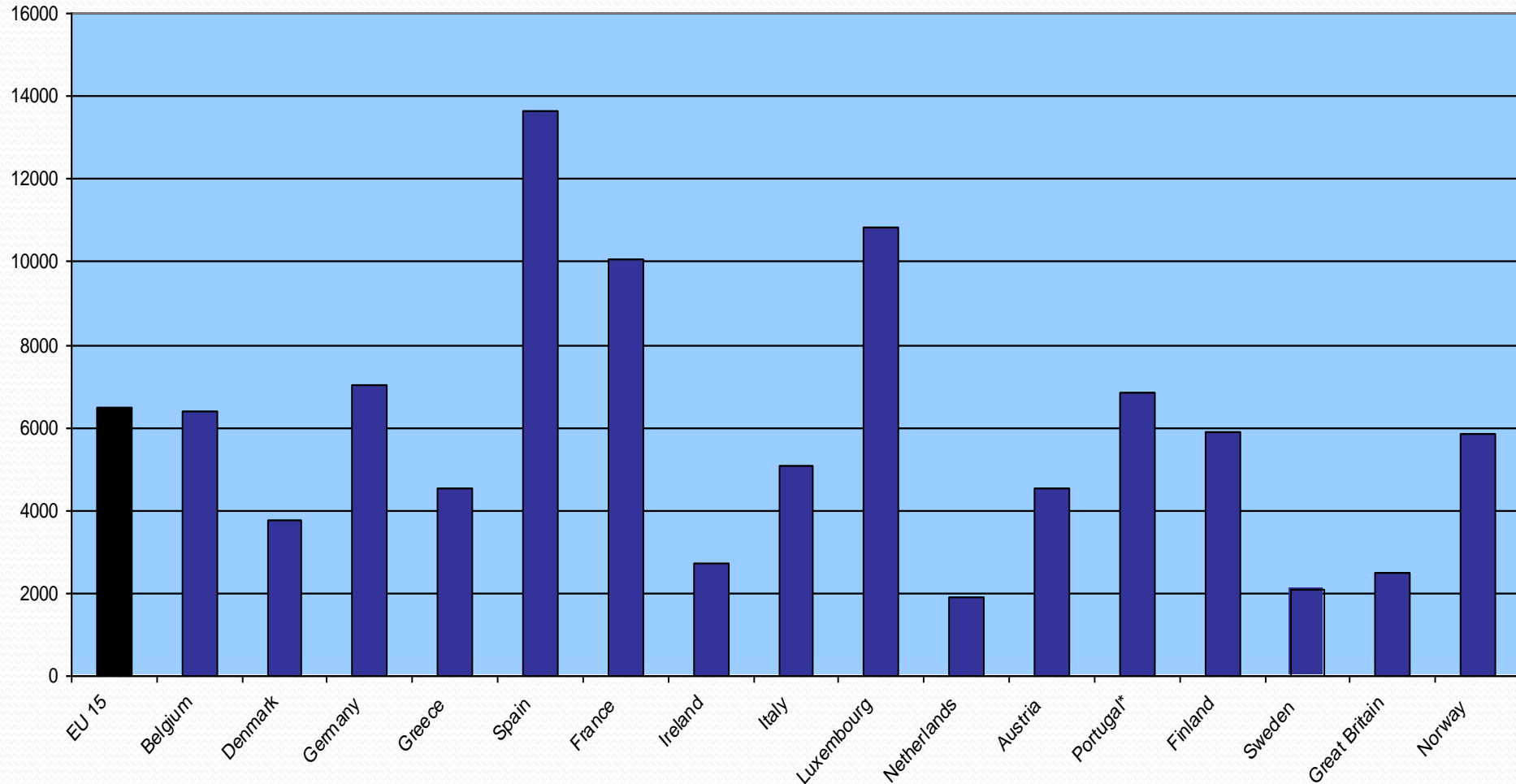


Number of Fatal accidents at work 1979-2005 in the Construction industry (NACE=F) in Sweden



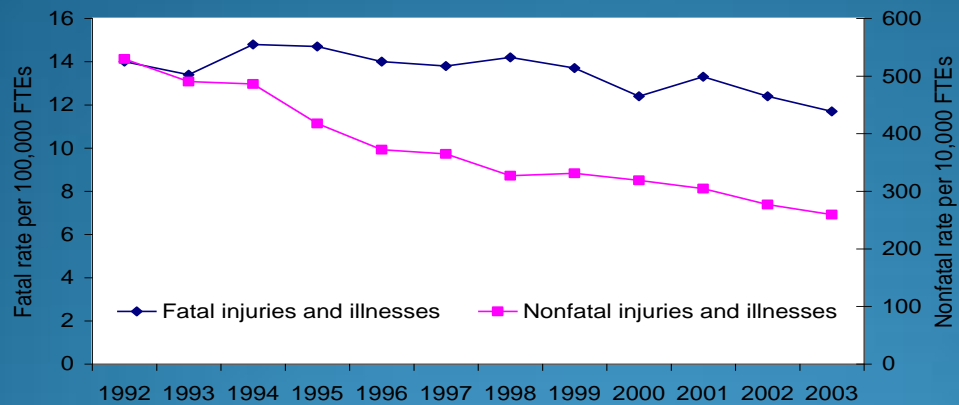
Source: SWEA/Statistics Division

Standardised incidence rate of accidents at work 2003, more than 3 days lost in Construction (NACE F) (rate per 100 000 workers). EU 15 and Norway



Source: Eurostat * 2002

Figure 2: Fatal and nonfatal rates of injuries and illnesses in construction, 1992 - 2003



FTE = Full-time equivalent, defined as 2,000 hours worked per year.

Note: Nonfatal data, with days away from work, private sector only, the self-employed excluded

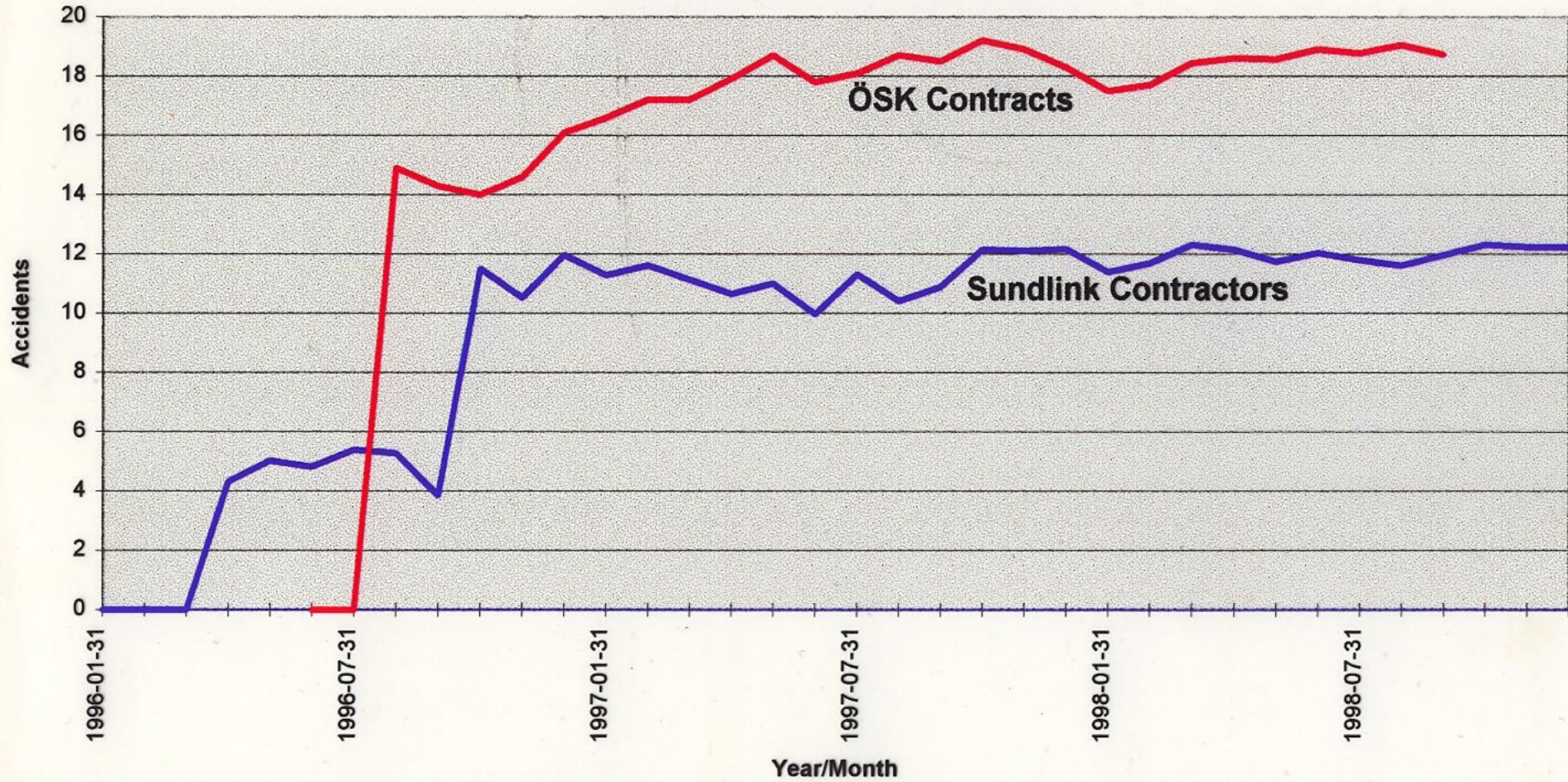
Source: BLS: Census of Fatal Occupational Injuries, Annual Survey of Occupational Injuries and Illnesses, Current



Built between 1993 – 1997
Length; 1 800 m
Span; 1 200 m
Pylon; 180 m
Concrete; 40 000 m³
6 000 man-years
Reported no of accidents; 0!



Accidents/1 000 000 workhours
Accumulated from beginning project.



O.S.H

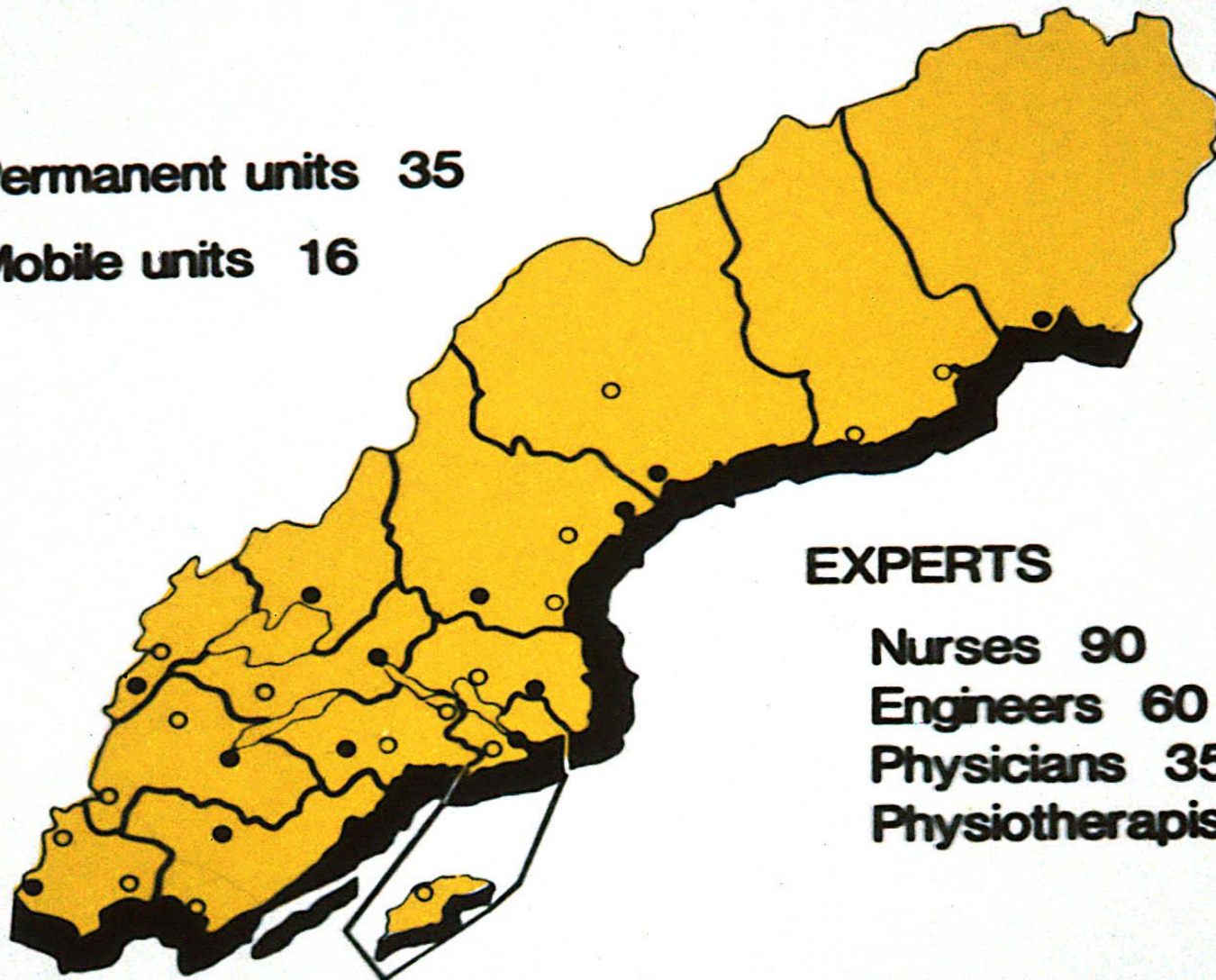


- Any day at any time and anywhere in the world 'Safety' is a clear-cut barometer of organizational excellence. There cannot be an excellent organization that has a lot of accidents

Bygghalsan Facilities/Teams

Permanent units 35

Mobile units 16



EXPERTS

Nurses 90

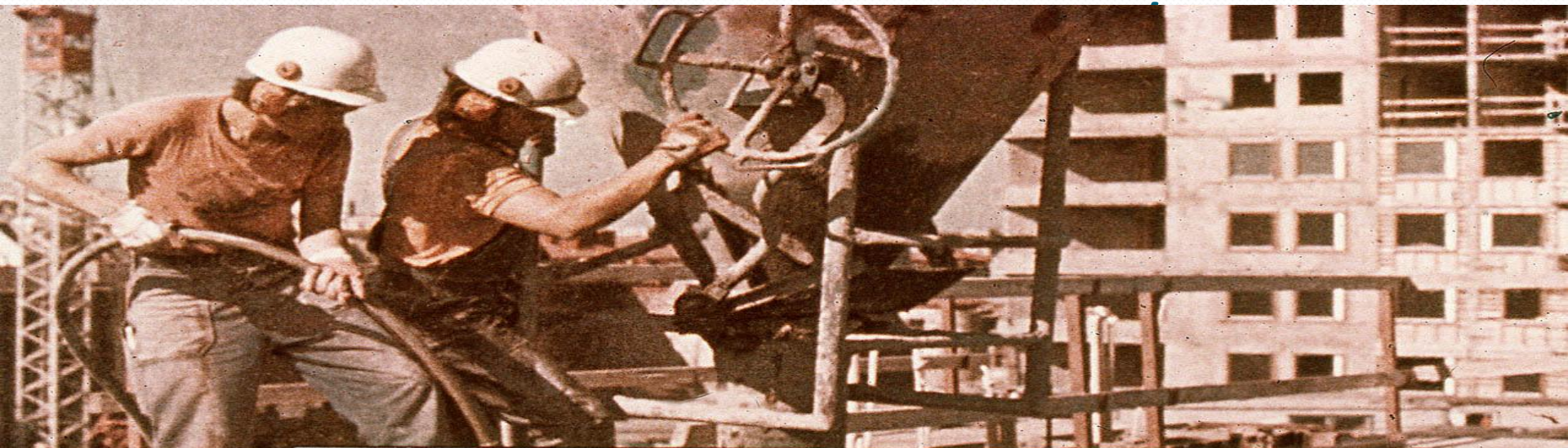
Engineers 60

Physicians 35

Physiotherapists 21

Mobile Unit



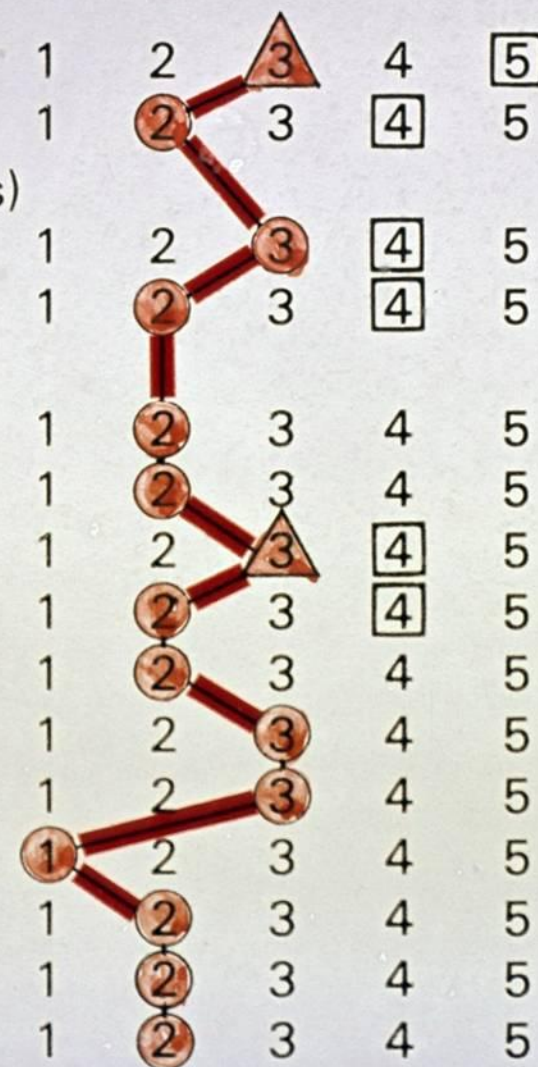


Belastningsfaktorer	Graderingsskala
01 Arbetsbelastning (pulsfrekvens)	1 2 3 4 5
02 Belastning på övre extremiteter (hand och handled, armbags- och axelled)	1 2 3 4 5
03 Belastning på rygg	1 2 3 4 5
04 Belastning på undre extremiteter (fot och fotled, knä- och höftled)	1 2 3 4 5
28 Damm från stenmaterial (betong)	1 2 3 4 5
40 Buller	1 2 3 4 5
41 Vibrationer och skakningar	1 2 3 4 5
45 Väta på grund av arbetsprocessen	1 2 3 4 5
60 Nedstörtning	1 2 3 4 5
61 Snubbling och halkning	1 2 3 4 5
62 Fallande föremål	1 2 3 4 5
63 Klämning	1 2 3 4 5
67 Splitter och stänk	1 2 3 4 5

PROFILE OF ENVIRONMENT

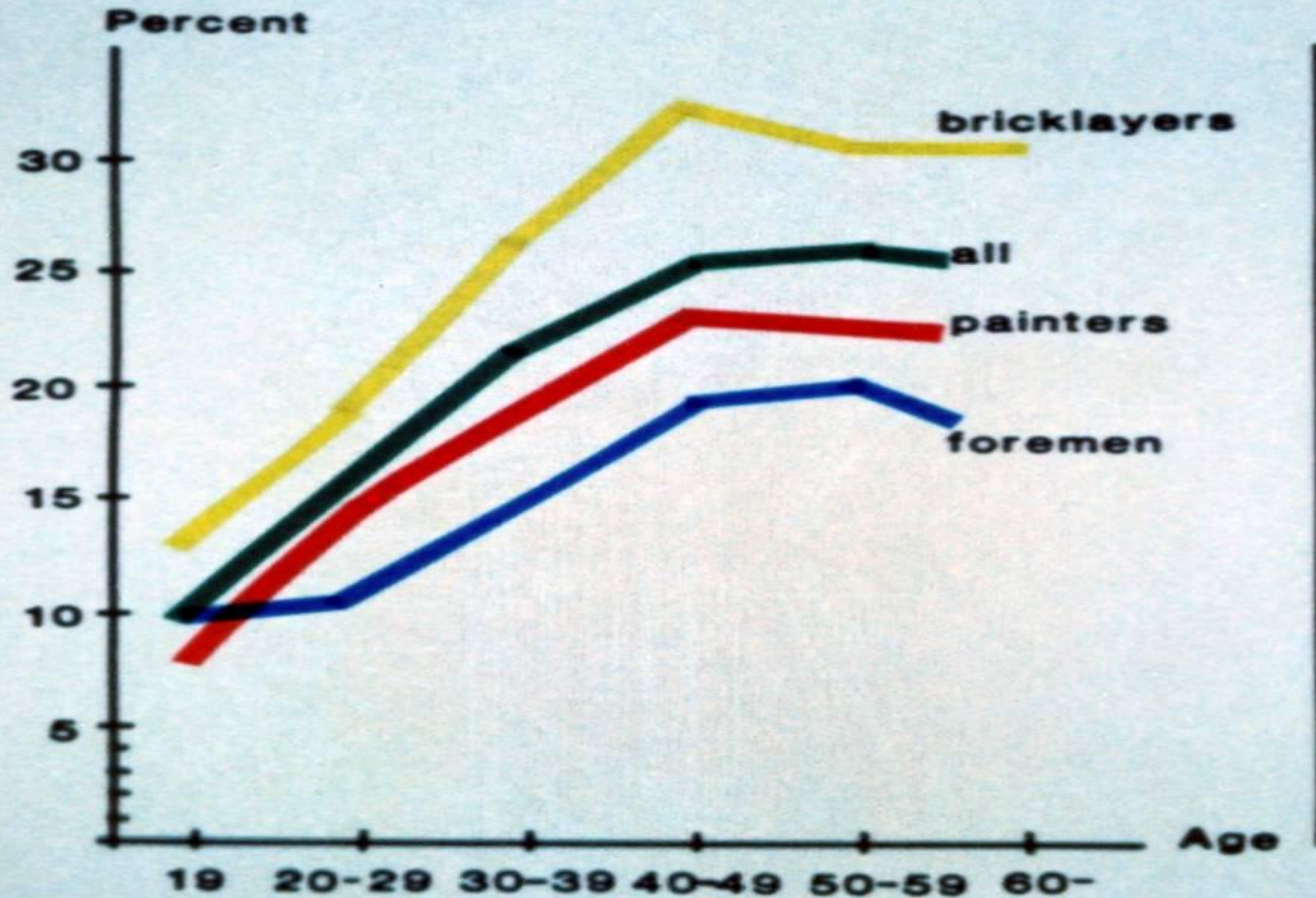
Load factors

01 Work load (pulse frequency)	1	2	3	4	5
02 Load on upper extremities (hand and wrist, elbow- and shoulder-joints)	1	2	3	4	5
03 Load on back	1	2	3	4	5
04 Load on lower extremities (foot and foot-joint, knee and hip-joint)	1	2	3	4	5
26 Oil mist	1	2	3	4	5
28 Stone material dust	1	2	3	4	5
40 Noise	1	2	3	4	5
41 Vibration and shaking	1	2	3	4	5
45 Wet due to working process	1	2	3	4	5
60 Falling	1	2	3	4	5
61 Stumbling and slipping	1	2	3	4	5
62 Falling objects	1	2	3	4	5
63 Squeezing	1	2	3	4	5
64 Tramping on, thrust by or against object	1	2	3	4	5
67 Fragments and splash	1	2	3	4	5





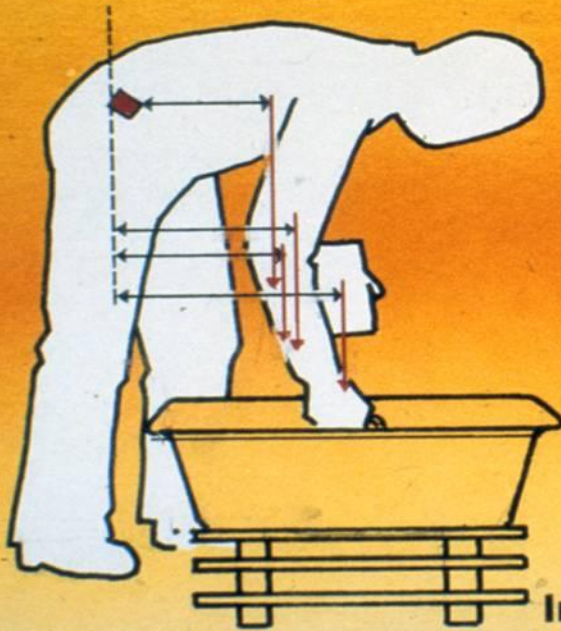
Backproblems



Work preventing pains from lower back during the last year before the examination
Answers from 40,000 construction workers

Bricklaying
Ergonomy

140 Nm



67 Nm

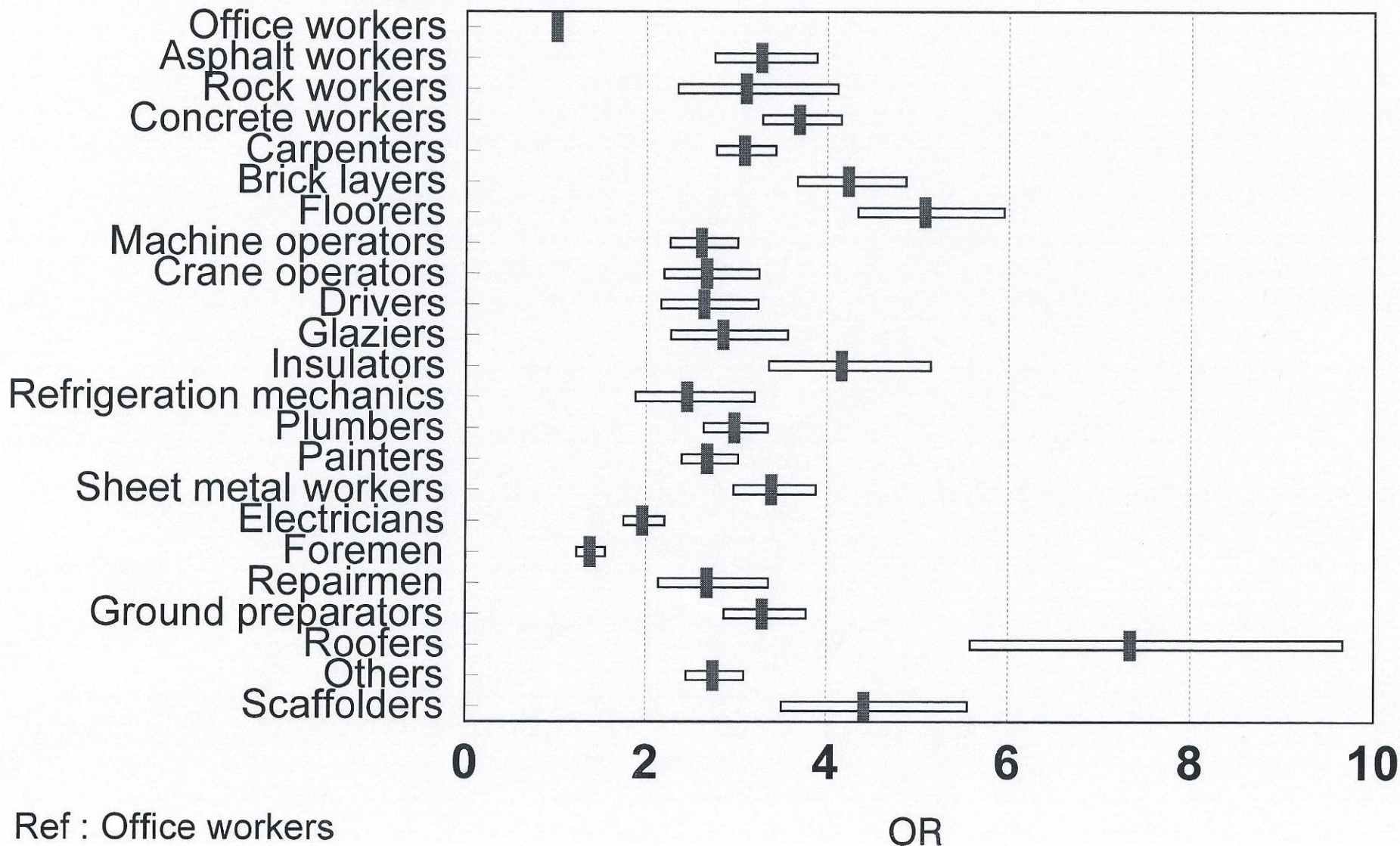


Improvement ≈ 70 NM, 800 times a working day
Investment in lowered platform



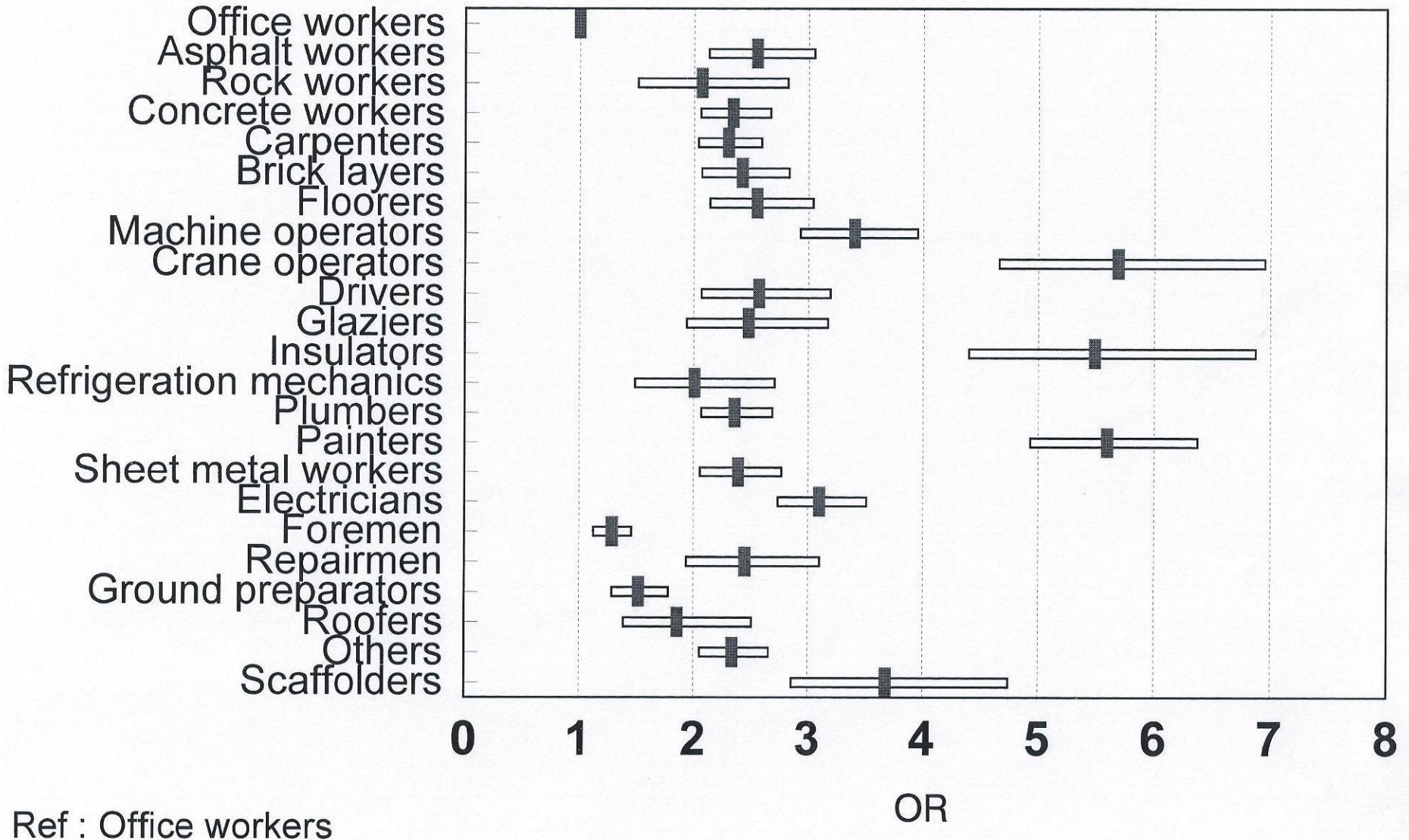
Lower back disorder by occupation

OR, 95 % C. I.

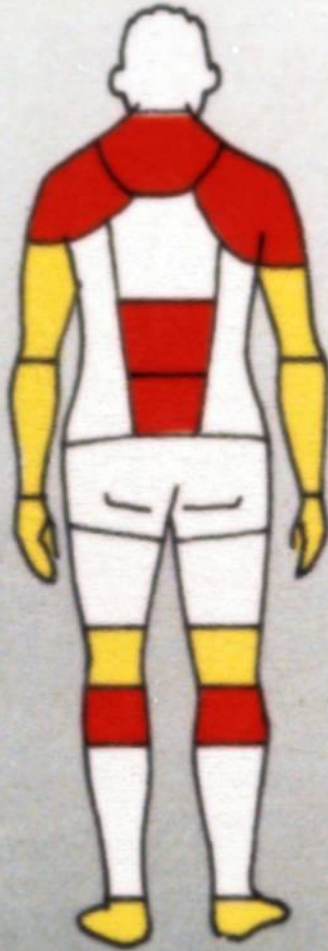


Neck disorder by occupation

OR, 95 % C. I.



Ergonomic profile



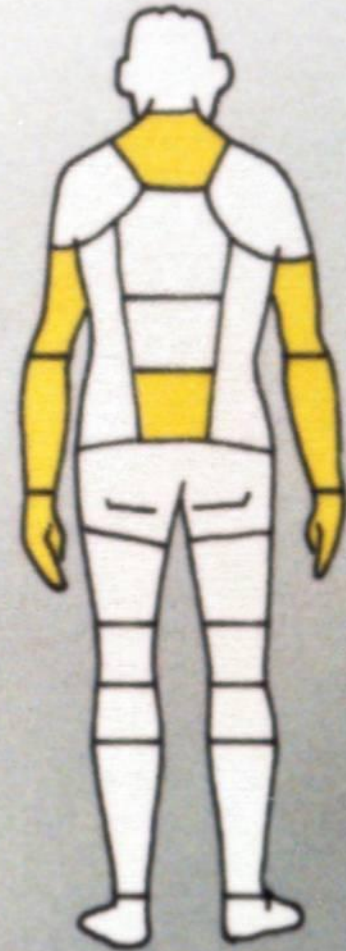
No load



Some load



High load



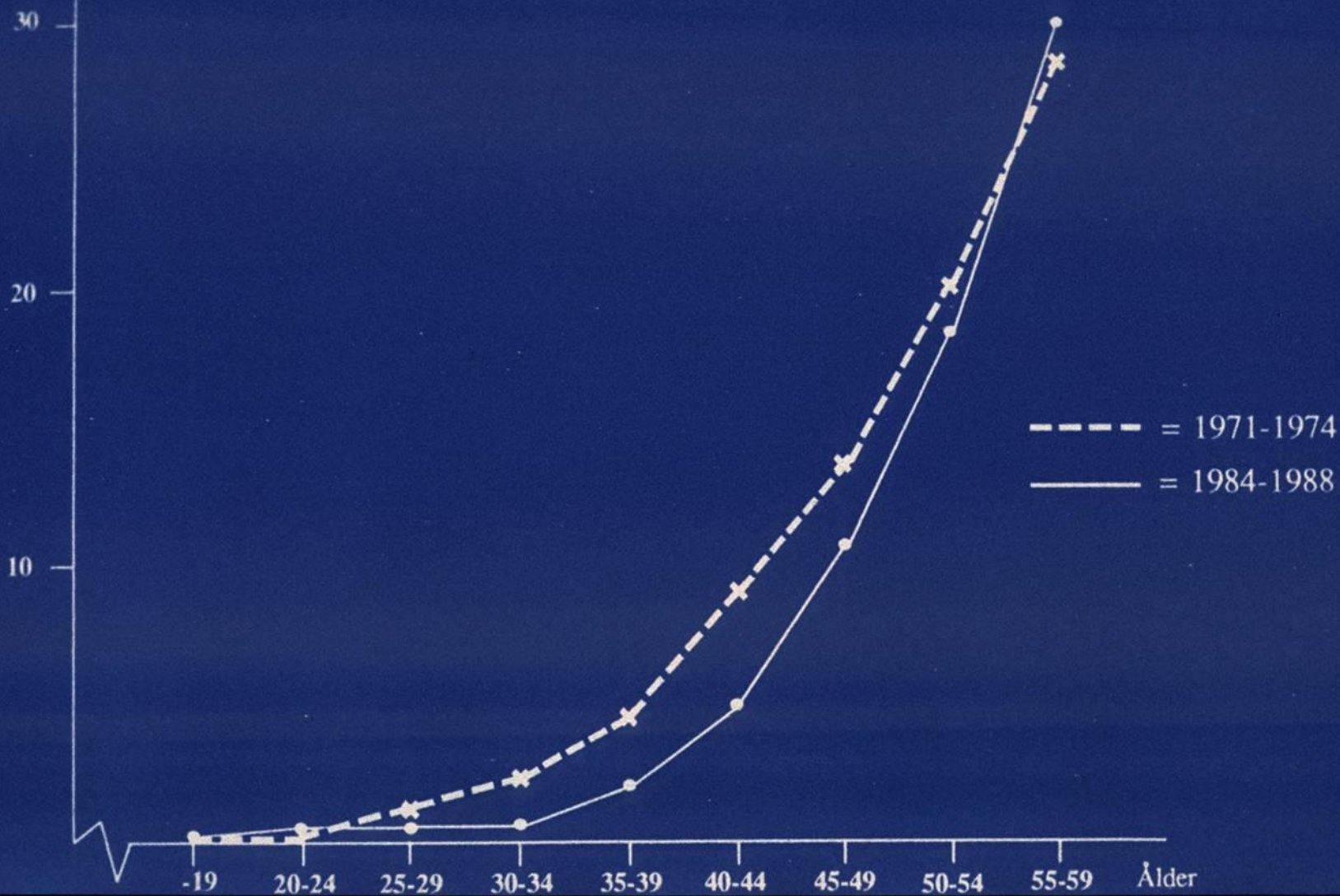
Conventional welding

Welding from pallet





Procent med 5%-ig
hörselinvaliditet



Chemical hazards in construction

SKIN – cement (allergic Cr6+, alkaline), isocyanats

RESPIRATORY TRACT – silica, asbestos, cement dust (COPD & pharyngeal cancer)

CENTRAL NERVOUS SYSTEM - Solvents

Lung carcinogens in the construction industry – IARC classification

- Asbestos I Insulation
- Silica I Rock-/tunnel work
- PAH I Coal tar – roofers
- Chromium 6+ I Welding - steel
- Diesel exhaust IIa Truck etc driving
- Radon I Tunnel work
- Painter I

Cancer findings in conclusion

- All types of studies from different parts of the world show excess cancer in construction workers compatible with known exposures possessing cancer risks
- Cement and Silica dust exposure associated with excess of lip, pharynx, esophagus and stomach cancer and also with respiratory cancers
- Asbestos exposure associated with excess of larynx, lung and pleural cancers
- The asbestos exposure causes the highest risks and should be the easier one to eliminate

Germany 1980: roofer grinding asbestos cement corrugated sheets
(about 30 WHO-**chrysotile** fibres/ml)





Germany today: spray asbestos-removal (chrysotile)



Asbestos Consumption, 2000

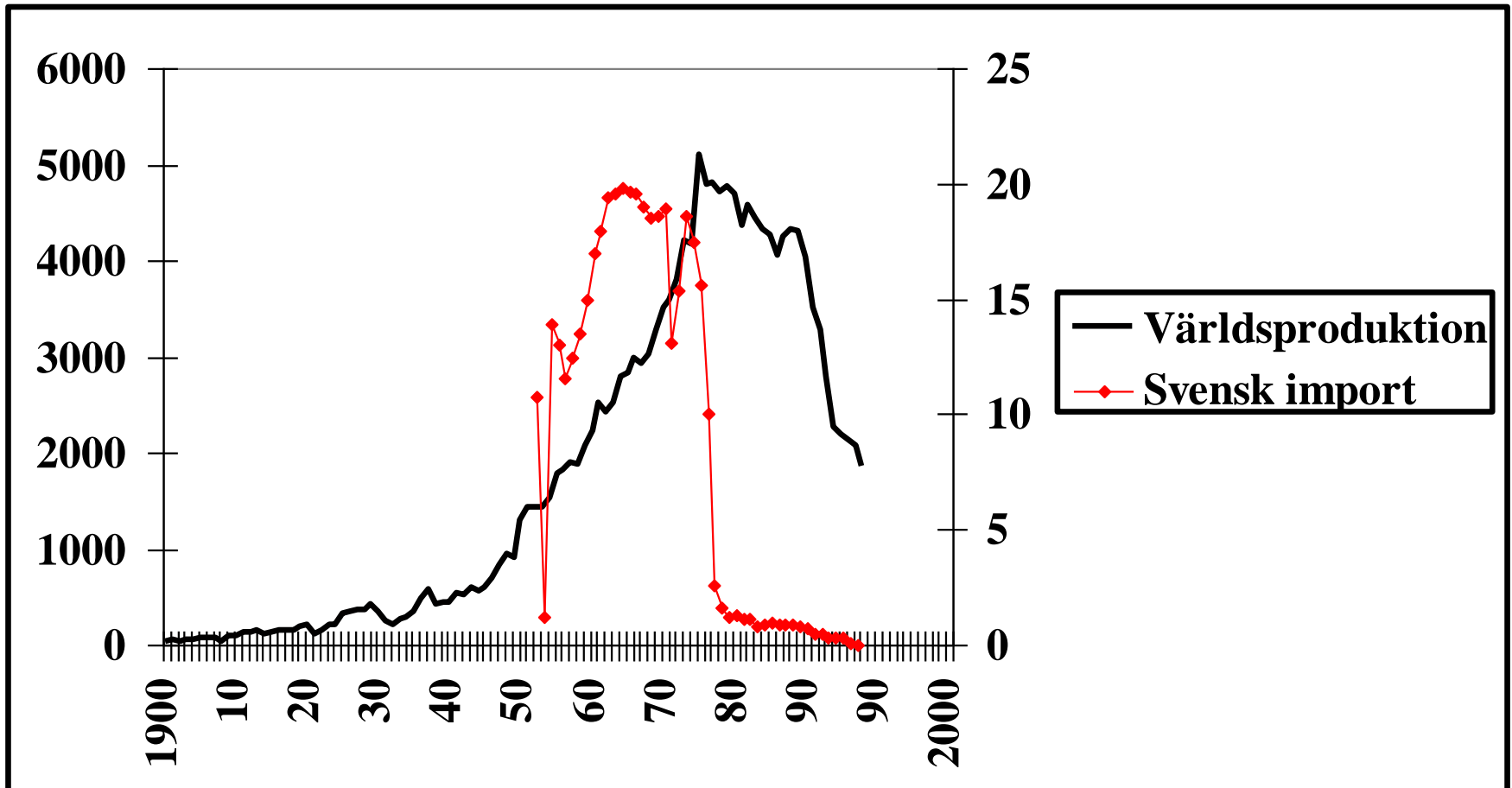
Country	Tons	Kg/capita/yr
Russia	447,000	3.4
China	410,000	0.4
Brazil	182,000	1.3
India	125,000	0.2
Thailand	121,000	3.0
Japan	99,000	1.5
Indonesia	55,000	0.3
Mexico	27,000	0.4

World production: 2'070'000 tons in 2000

Source: US Geological Survey, 2000

Asbestproduktion

1 000 ton



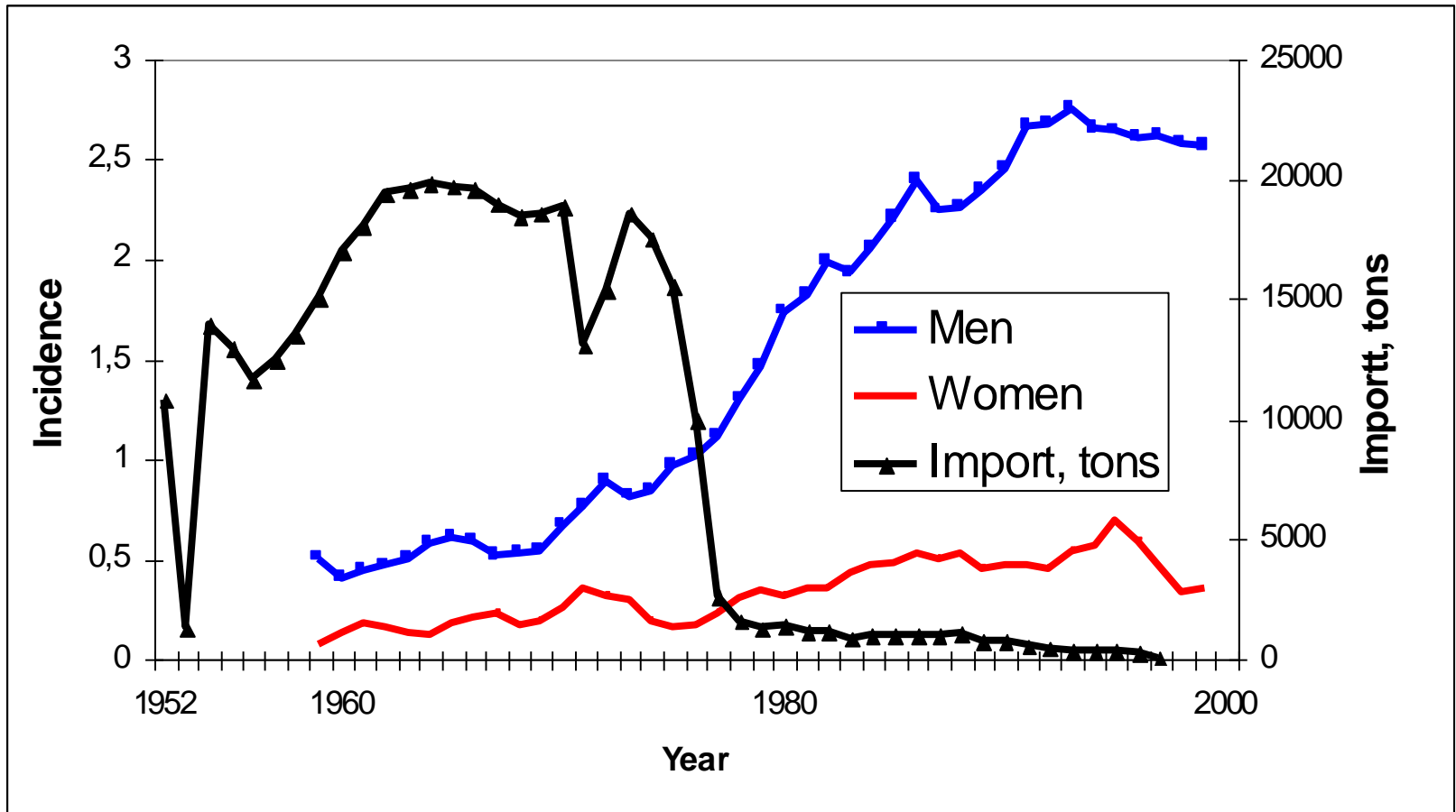
Asbestos products by properties

- **FIRE PROTECTION/
HEAT INSULATION**
- Asbestos textile
- Sprayed asbestos
- Asbestos cement
- Asbestos masses
- **ALKALIRESISTANCE**
- Carpet underside
- **REINFORCEMENT**
Asbestos cement
- Plastic products
(carpets)
- **TIXOTROPIC**
- Mortar
- Plugs
- Paints and Glues
- Fillers

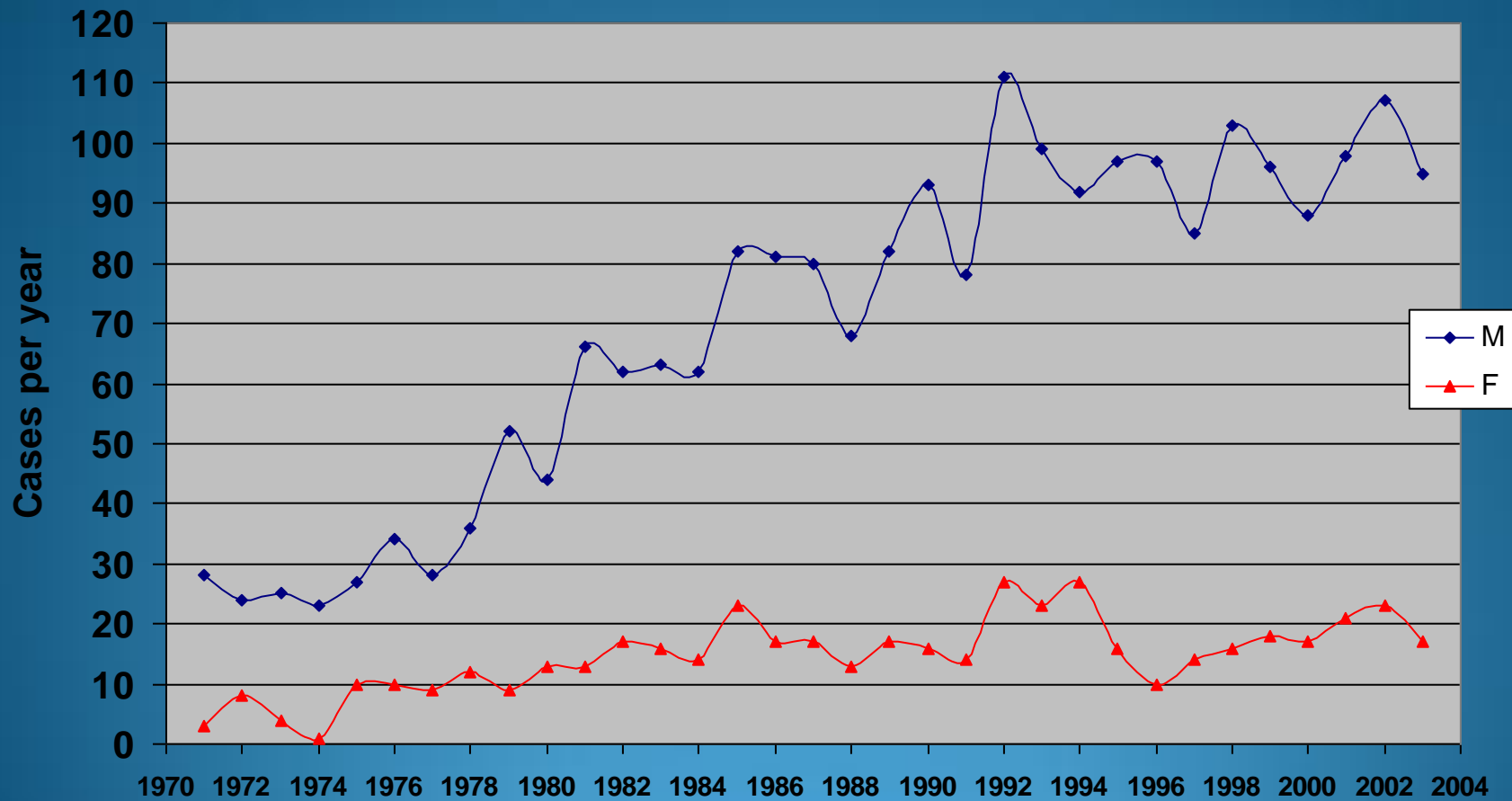
End-user in transition economies

- The major ultimate asbestos end-user is in the construction industry
- Construction industry uses the majority of the asbestos containing products
- Construction industry belongs to high extent to the informal sector
- Occupational injuries and diseases difficult to identify in informal sector

Annual import of asbestos and incidence of pleural tumours in Sweden



Number of incident cases of pleural tumours (mesotheliomas) in Sweden. 1971-2003



Source: National Board of Health and Welfare

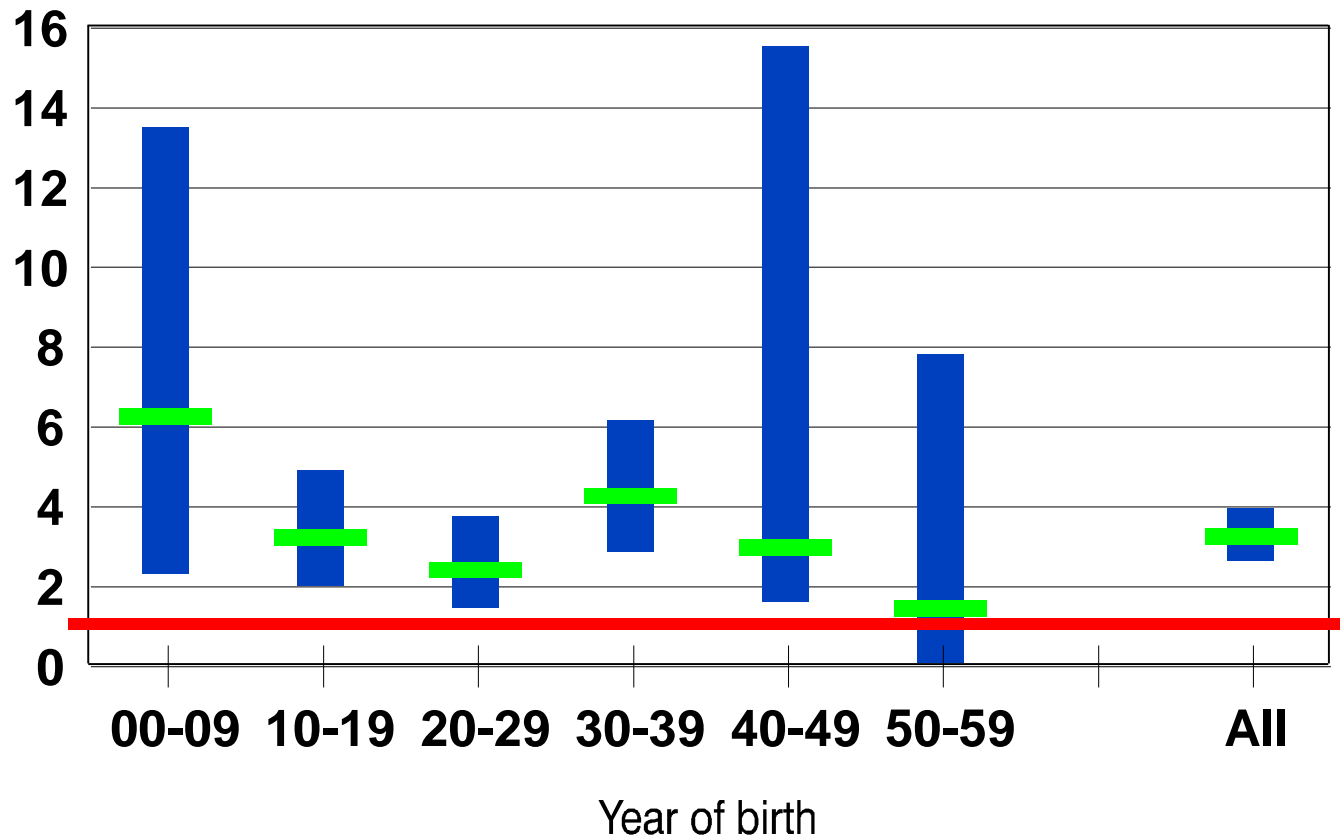
Incidence in 370,000 Bygghälsan examinees

	Pleural tumours			Lung cancer		
	Obs	Exp	SIR	Obs	Exp	SIR
Heavily exposed	92	28.9	3.18	693	608.3	1.14
Other professions	123	102.2	1.20	2312	2298.2	.99
All examinees	215	131.1	1.64	3005	2906.4	1.03

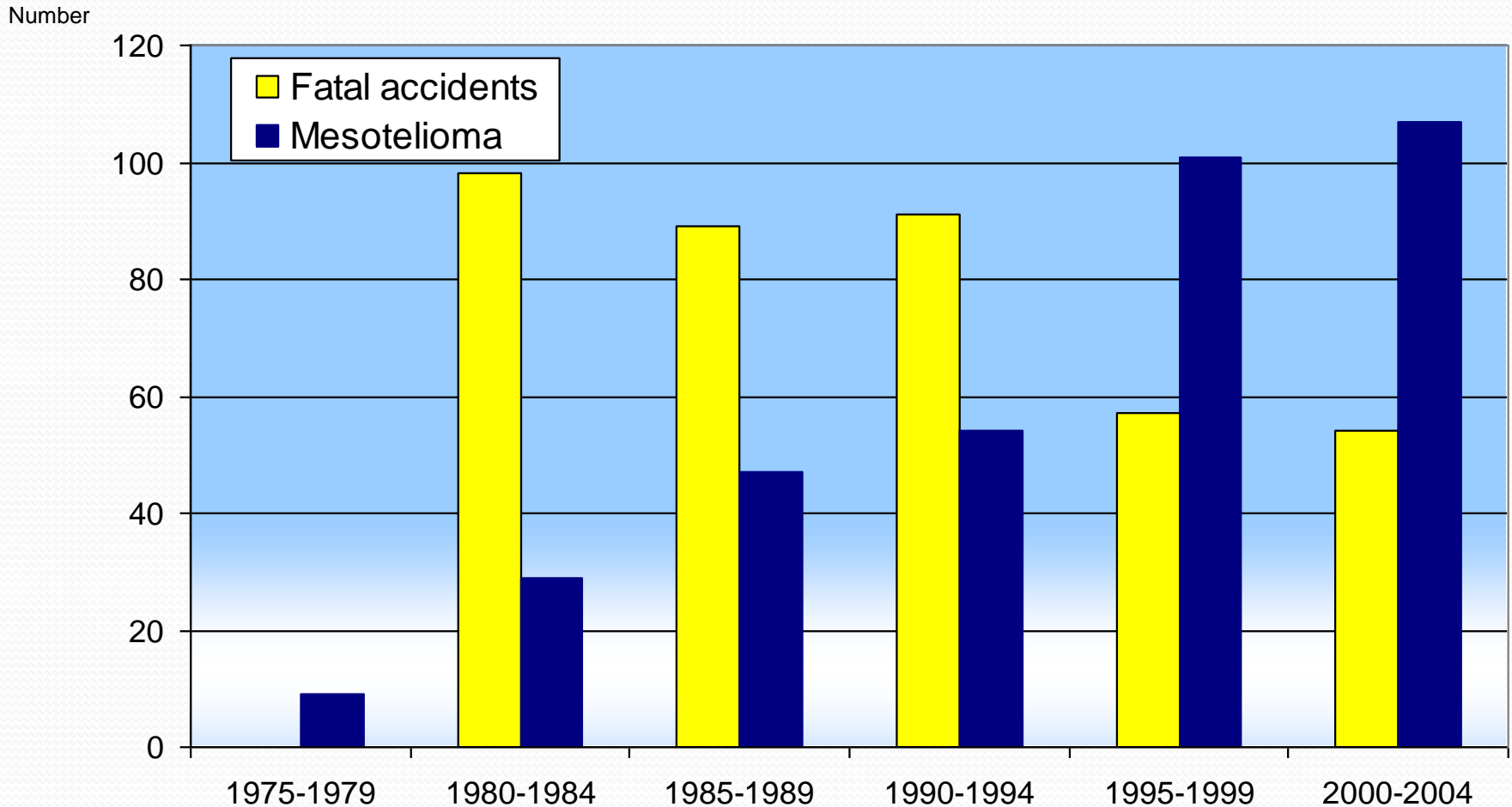
Self-reported Asbestos Exposure in Pleural Mesothelioma Cases

Self-reported asbestos exposure	Cases	Controls
No	72	1417
Yes	13	283

Pleural tumour incidence in heavily exposed groups by birth cohort, SIR, 95 % C.I.

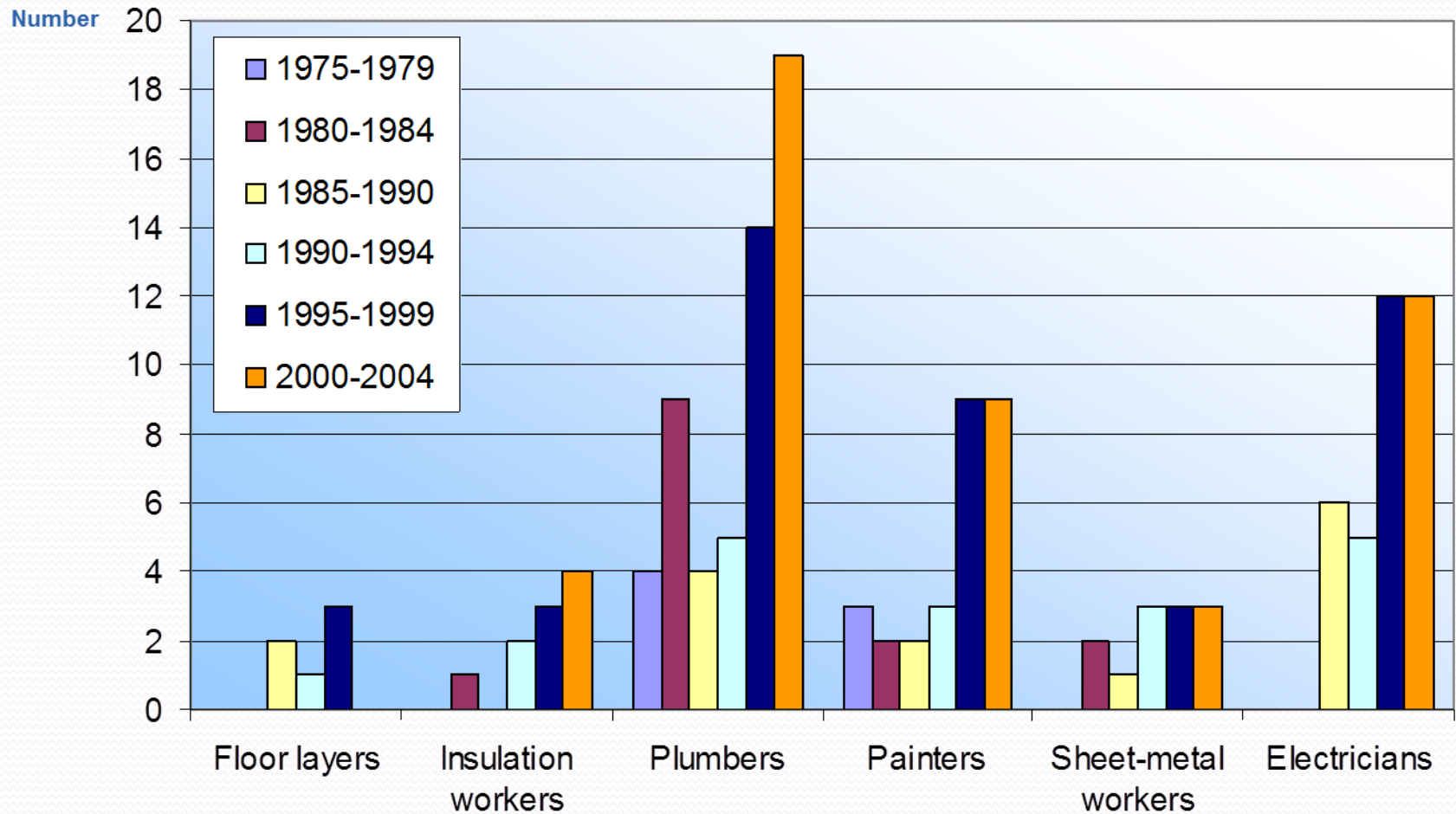


Number of Fatal accidents at work and number of Mesotelioma cases in the Construction industry (NACE=F) in Sweden



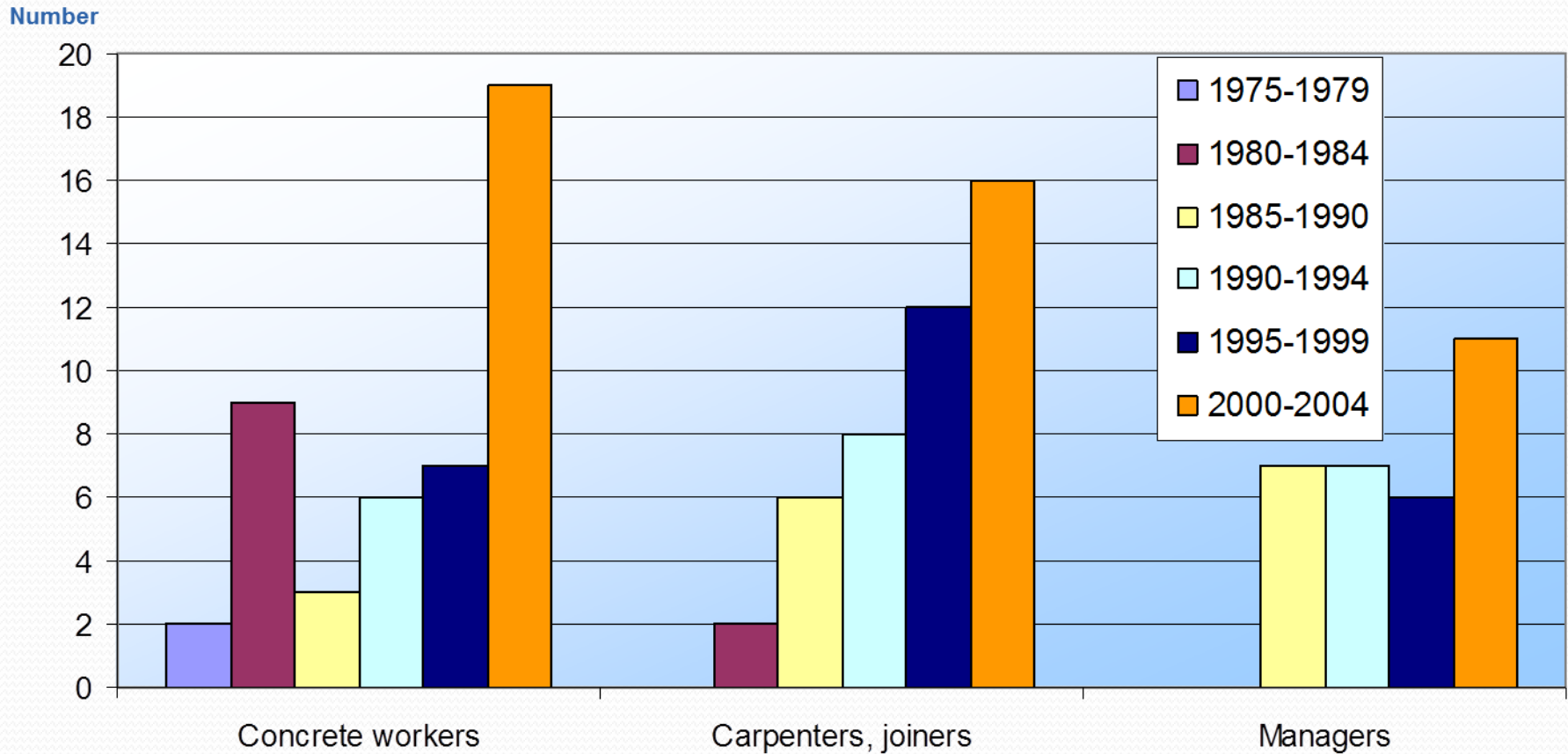
Source: SWEA/ISA, Department of Occupational Health/Umea University

Number of Mesotelioma cases for exposed occupational groups in the Construction industry (NACE=F) in Sweden, 1975-2004



Source: Department of Occupational Health/Umea University

Number of Mesotelioma cases for exposed occupational groups in the Construction industry (NACE=F) in Sweden, 1975-2004



Source: Department of Occupational Health/Umea University

Pleural Mesotheliomas in Swedish Construction Workers

- 367,568 workers examined 1971-93
- 420 pleural mesotheliomas 1972-2009
- 20% of all male cases since late 90's
- 35 - 40% of all cases born 1935-44 is a construction worker
- 80% not in highest risk groups (insulator and plumber)

»A step ahead«

