

AN OUTBREAK OF DERMATITIS AMONG STEVODORES

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SUMMARY

Cement is a common cause of dermatitis. Workers affected are usually those in cement factories and at building construction sites. Cement dermatitis among port-workers is not so commonly reported.

This paper describes an outbreak of dermatitis among stevedores at a port handling cement. The cement was imported in bags, and because of breakage, there was much spillage. It was also hot and dusty inside the hatch of the ship, and some of the stevedores worked bare-bodied. Cases of dermatitis began to appear in January 1983 and reached a peak in April 1983, gradually subsiding over the next few months to August 1983. This coincided with the increased tonnage of cement handled at the port.

A total of 33 stevedores were reported as having dermatitis over this period. Of the 15 cases

examined, 13 had eczema, and in 19 the hands and wrists were affected. However, most of the cases had multiple site involvement, including the arms, legs and abdomen.

Samples of cement showed the presence of water-soluble chromium, varying from 9.9 to 17.8µg/g.

As the stevedores were reluctant to go for skin patch-testing, only four were tested, but two did not return for the reading of the results. The other two were found to have a positive reaction to dichromates. The outbreak of dermatitis was probably due to several factors which are discussed.

INTRODUCTION

Industrial or occupational skin diseases are the most common of all occupationally-related diseases.¹ This condition has been defined by the Committee on Occupational Diseases of the American Medical Association as "a pathological condition of the skin for which job exposure can be shown to be a direct or contributory factor".²

Many substances or chemicals encountered in industry can give rise to contact dermatitis. One of these is cement. Cement dermatitis has been widely reported in the literature, but it is more frequent among cement users (e.g. bricklayers, masons) at construction sites than among workers in cement factories.³ Cement dermatitis among

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port-workers is not commonly reported. But stevedores at a port may have to handle different types of cargo, including cement.

We describe an outbreak of dermatitis among stevedores at a port handling cement, and discuss some of the salient points.

CASE REPORT

In April 1983, the Department of Industrial Health of the Ministry of Labour, Singapore, was informed of a "dermatitis problem" among stevedores at a port. On investigation, it was found that the dermatitis problem affected mainly stevedores who handled bags of cement. They were contract workers supplied by an outside contractor. Cases of dermatitis had started appearing from January 1983.

When a ship arrived at the wharf, the stevedores would board it, and go down into the hatch where the cargo was. They carried bags of cement and stacked them on a wooden pallet which was then lifted up and out of the hatch by a crane (Figs. 1 and 2). The bags of cement were then transported by fork-lift trucks on the wharf and taken to a warehouse nearby.

It was very dusty and hot inside the hatch of the ship. The cement bags were made of paper, and some of them were torn resulting in much spillage of cement. The clothing worn by the workers was very variable. Some wore shirts and long trousers, while others wore only shorts and were bare-bodied. Some workers wrapped plastic sheets around their waists to protect their legs from the dust. Cotton gloves were worn by some workers.

Visits were made to the port on 10 and 11 May 1983 when a total of 119 stevedores were examined. Of these, 71 were from one contractor and they handled the bags of cement; the other 48 workers were from other contractors and they handled other types of cargo. Of the 71 stevedores who handled cement, 21 had evidence of dermatitis on examination, and another four had

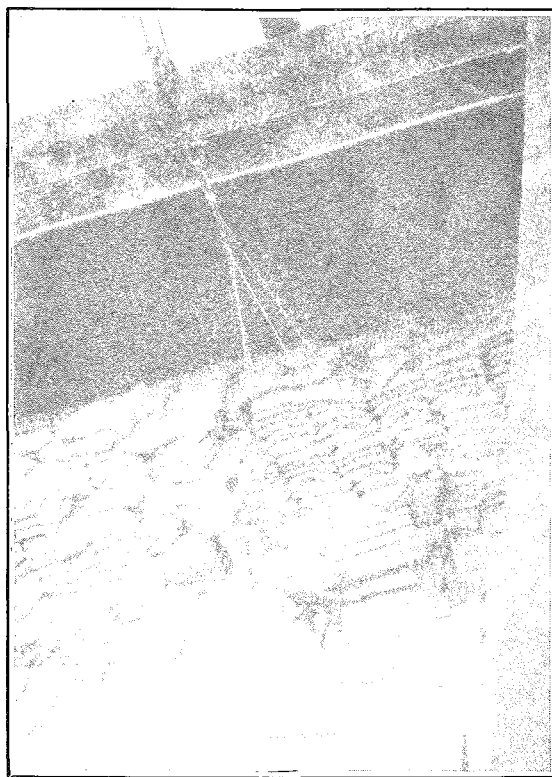


Fig. 1 Workers load bags of cement on to a wooden pallet.

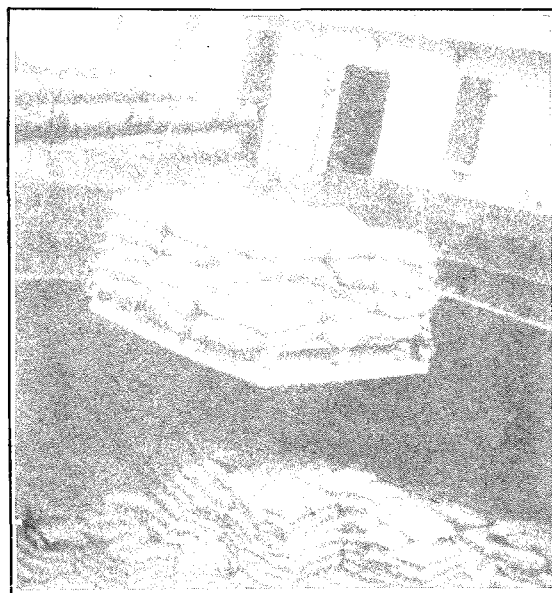


Fig. 2 The pallet with bags of cement is lifted by crane out of the ship's hatch.

excoriations and abrasions on their skins, some of which could have been due to scratch marks. The workers complained that their rash was very itchy. Most of the rashes seen was eczematous, involving mainly the hands and wrists, although other parts of the body were also affected. (Figs. 3, 4 and 5) Tables I and II). Of the 48 stevedores who handled other types of cargo, only one had evidence of dermatitis.

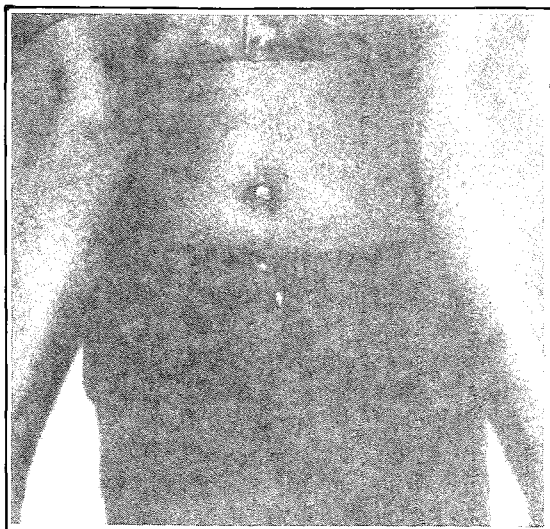


Fig. 3 Eczematous dermatitis on the arms and abdomen of a worker.

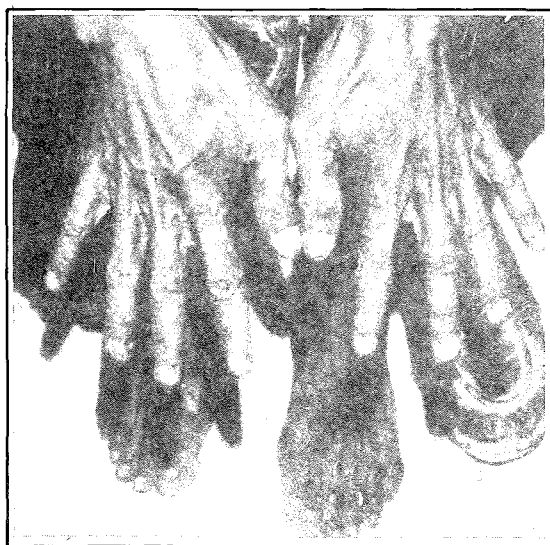


Fig. 4 Eczema on the fingers and feet of a worker.

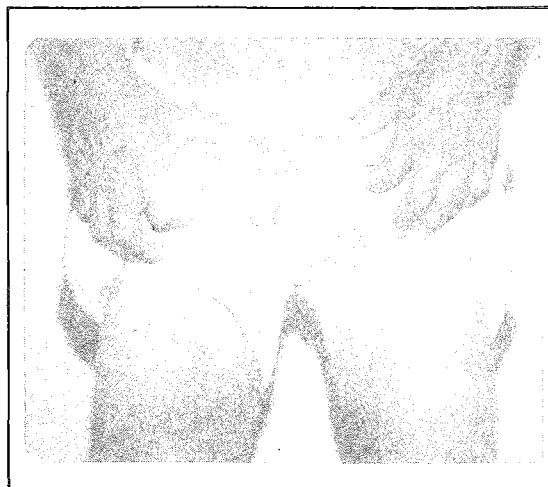


Fig. 5 Dermatitis on the abdomen and thighs.

**TABLE I
PREDOMINANT SKIN LESIONS IN
25 STEVEDORES HANDLING CEMENT**

Main type of skin lesions	No. of workers
Eczema	13
Papules only	6
Abrasions/excoriations	4
Erythema	1
Hyperpigmentation	1
Total	25

**TABLE II
SITES OF SKIN LESIONS IN
25 STEVEDORES HANDLING CEMENT**

Site of skin lesions	No. of workers
Hands and wrists	19
Forearms	10
Thighs	9
Abdomen	7
Arms	4
Feet and ankles	4
Legs	3
Genitals	3
Chest	1

(Note: Most workers had multiple site involvement).

It was revealed that, starting from December 1982, there was a great increase in the importation

of cement owing to shortage and increased demand from an active building construction industry. The number of dermatitis cases among the stevedores started to increase from January 1983 to April 1983, coinciding with a tremendous increase in the amount of cement imported (Table IV). On follow-up of the situation to December 1983, it was found that the number of dermatitis cases subsided in August when there was one case, after which no more cases were reported. This corresponded with a reduction in the amount of cement handled at the port.

The bags of cement came mainly from Taiwan, Japan and Korea. Samples of the cement were sent to the Department of Scientific Services for analysis and the results showed that water-soluble chromium was present (Table IV).

Workers with dermatitis were requested to go to the Middle Road Hospital, a specialist dermatology hospital, for patch-testing. However, most of them were reluctant to do so. After much persuasion, four were patch-tested at the

TABLE III
THE NUMBER OF CASES OF DERMATITIS
IN RELATION TO THE AMOUNT OF
CEMENT IMPORTED*

Month	Cement imported (metric tonnes)	No. of dermatitis cases**
Oct. '82	7,402	—
Nov. '82	800	—
Dec. '82	61,608	—
Jan. '83	21,646	2
Feb. '83	27,818	2
Mar. '83	35,353	4
Apr. '83	109,937	13
May. '83	72,971	4
Jun. '83	58,538	1
Jul. '83	53,720	6
Aug. '83	63,595	1
Sep. '83	62,324	—
Oct. '83	56,587	—
Nov. '83	8,520	—
Dec. '83	7,303	—

* Time period from October 1982 – December 1983.

** These figures were based on interviews of workers, and notifications from doctors.

TABLE IV
CHROMIUM CONTENT IN CEMENT SAMPLES

Origin of Cement	Content of water-soluble chromium ($\mu\text{g/g}$)
Taiwan	17.8
Japan	16.9
Korea	9.9

hospital, but two of them did not return for the reading of the patch test results. The other two were found to have a positive reaction to dichromates at 48 hours.

DISCUSSION

Although dermatitis resulting from contact with cement is quite common, it has been reported mainly among cement users like brick-layers and masons on construction sites where contact with the substance is widespread. Cement manufacturing plant workers may also get the dermatitis.³ An outbreak of cement dermatitis among stevedores, who are neither involved in manufacturing cement nor as "users" of it, is not so common.

There were probably several factors related to this outbreak of dermatitis. Because of the great increase in importation of cement, there was increased workload and contact with cement among the stevedores. The cement bags were made of paper, easily torn with much spillage. The hatch of the ships was dusty and hot. Because of this, some of the workers worked bare-bodied and therefore direct skin contact with cement dust was increased. Profuse sweating under such conditions would contribute to and aggravate the dermatitis.

The high alkalinity of cement is an important factor in cement dermatitis.³ Normal skin has an acid pH, and the alkalinity of cement dehydrates the keratin of the skin.⁴ Chromates in the cement can cause cutaneous irritation and allergic sensitisation. Sensitisation is enhanced by pre-existing irritation from the alkalinity of the

cement.⁵ Hexavalent chromium which is found as an impurity in cement is easily absorbed through the outer skin layers. Under the skin, it is transformed into trivalent chromium which becomes bonded with proteins. These proteins are then interpreted by the body's immunological system as foreign substances, resulting in allergic eczema.⁶

Thus dermatitis from contact with cement could be due to both an irritant as well as a sensitising effect. In this outbreak, the large numbers of workers affected may suggest that an irritant effect was probably significant, although sensitivity to chromates was shown in two of the workers on patch-testing.

Since the raw materials used for cement do not usually contain chromium, there has been speculation as to the source of the chromium. It has been postulated that abrasion of the refractory lining of the kiln or the steel balls used in grinding mills, in the manufacture of cement could have resulted in the presence of chromium compounds in the cement.³

This outbreak of dermatitis has illustrated the various factors that have contributed to and aggravated the problem.

ACKNOWLEDGEMENTS

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REFERENCES

- 1 WHO. The work of the WHO, 1971. *Annual Report of the Director-General to the World Health Assembly*, Geneva, 1971.
- 2 Herszenon S. Dermatitis — in touch with omnipresent causes. *Occupational Health & Safety* 1980; 49: 19–24.
- 3 Prodan L. Cement. In Parmeggiani L (ed.) *Encyclopaedia of Occupational Health & Safety* 1983; 1: 436–439.
- 4 Symposium on skin cleansing, 29–30 April 1965. *Transactions of the St John's Hospital Dermatological Society* 1965; 51: 2.
- 5 Adams R M. *Occupational contact dermatitis*. Phil & Toronto: J. B. Lippincott, 1969.
- 6 Cement dermatitis. *Working Environment*, International edition, 1980.