HETA 96-0098-2591
BTR Antivibration Systems, Inc.
Logansport, Indiana

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PREFACE

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ACKNOWLEDGMENTS AND AVAILABILITY OF REPORT

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SUMMARY

On March 6, 1996, the National Institute for Occupational Safety and Health (NIOSH) received a request from the employer for a health hazard evaluation (HHE) at the BTR Antivibration Systems, Inc. plant in Logansport, Indiana. According to the request, there had been a recent increase in reported skin problems among employees. On April 8 and 9, 1996, NIOSH representatives conducted a walk-through inspection and an environmental survey and confidential interviews/skin examinations with 22 employees that were experiencing symptoms. Occupational Safety and Health Administration (OSHA) Injury and Illness Logs, medical records, and Material Safety Data Sheets were reviewed.

For the 17 workers seen by a physician for their skin problems, the final diagnoses were varied and included nonspecific dermatitis (3 workers), irritant contact dermatitis (2), nummular dermatitis (1), irritant or allergic contact dermatitis (1), dyshidrotic eczema (1), lichen simplex chronicus (1), urticaria (1), blister (1), rosacea (1), alopecia areata (1), furuncles (1), urticarial vasculitis (1), nummular psoriasis (1), and psoriasis (1). Of the 21 employees with a history of skin problems, the distribution of the skin eruptions were varied as were the exposures that the employees subjectively associated with the onset of skin conditions.

The major focus of the environmental survey was to evaluate whether appropriate changes had been made to address the recommendations NIOSH provided during a previous HHE. Most of the recommendations had been addressed, but a few had not.

No specific explanation for the relative increase in skin problems among BTR employees was found. Based upon the variety of departments and job titles involved, the varied diagnoses and distributions of the skin problems, and the variety of reportedly associated exposures, it is unlikely that all the cases are related to one single exposure or work practice. The environmental survey and review of MSDSs revealed that workers at BTR have potential exposures to multiple known skin irritants and allergens, including but not limited to rubber products, adhesives, mold releasing agents, polymeric resins, petroleum hydrocarbon oils, solvents, and soaps and cleansers. Recommendations for the reporting and prevention of occupational skin diseases, for reducing chemical exposures, and for improving communication and education are included in the report.

KEYWORDS: SIC 3061 (molded, extruded, and lathe-cut mechanical rubber goods), rubber products, irritant reactions, allergic reactions, dermatitis.

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INTRODUCTION

On March 6, 1996, the National Institute for Occupational Safety and Health (NIOSH) received a management request for a Health Hazard Evaluation (HHE) at the BTR Antivibration Systems, Inc. plant in Logansport, Indiana. The request asked NIOSH to assess health concerns over recent increases in the number of employees with skin diseases in the plant, noted since January 1996. Possible environmental explanations indicated in the request included exposure to the many chemicals associated with rubber molding, as well as to solvent-based adhesive products. In response to this request, NIOSH representatives conducted a site visit to the plant on April 8 and 9, 1996.

BACKGROUND

The BTR Antivibrations Systems, Inc. (formerly Gen Corp Automotive) plant in Logansport, Indiana, produces automotive vibration control products using rubber stock from the BTR plant in Wabash, Indiana, and metal parts from a variety of companies. Approximately 497 people presently work in the plant in three shifts. The largest department is Department 634, or Toyo, which has 128 workers. This department contains metal preparation processes, molding presses, paint dip tanks, elastomer adhesive spray processes, grinding and buffing operations, assembly, and packaging. The employees in this department rotate jobs through all of the processes. Most of the processes have local exhaust ventilation (LEV), and there are several floor fans operating throughout the department. Similar operations take place in other areas of the plant. The plant has an on-site employee health unit that is staffed by a nurse.

In July 1994 NIOSH conducted an HHE at this plant (then Gen Corp Automotive), at the request of the United Rubber, Cork, Linoleum, and Plastic Workers of America. According to the request, workers in Department 634 had been experiencing skin problems and reproductive problems that they thought were work-related. There were concerns about exposures to various solvents and to nitrosamines. The results of that HHE (Report No. HETA 94-0190-2474) showed that workers may be exposed to low concentrations of solvents in this work area, but the concentrations measured on the day of the site visit were all well below the recommend standards. Some workers appeared to be experiencing irritant or allergic reactions, which might be work-related. Recommendations were made for reducing chemical exposures; for improved communication and education, especially concerning health and safety; and for management of employees' skin problems.

METHODS

On April 8, 1996, NIOSH representatives met with union and management representatives for an opening conference. During the opening conference, they provided information about NIOSH and the HHE program, discussed the history of health concerns and possible causes of dermatitis in the affected areas, and reviewed plans for this site visit. Following the opening meeting, a walk-through inspection of the plant was conducted.

In the afternoon and evening of April 8, the NIOSH representatives provided an opportunity for employees on the second and third shifts to participate in confidential interviews and, if indicated, undergo skin examinations. On April 9, additional interviews and skin examinations for third and first shift employees were conducted.

The interview information included the following:

a. Demographic and work history (name, age, race, gender, work area, shift, job title, and years worked at the job).
b. Medical history (history of allergies and skin problems).
c. Current or past potentially work-related skin problems (history, distribution, physical characteristics, symptoms, and associated exposures).

d. Medical work-up of the health problems (physician visits, diagnoses, medications, and medical tests).
e. Work practices (glove use, hand-washing, soap use, and use of barrier creams or moisturizers).

For employees who had sought medical care, attempts were made to obtain pertinent medical records. In addition, NIOSH representatives reviewed the Occupational Safety and Health Administration (OSHA) Log and Summary of Injuries and Illnesses (OSHA 200 logs), on-site medical records, and Material Safety Data Sheets (MSDSs). A further environmental survey was conducted with the major focus of evaluating whether appropriate changes had been made to address the recommendations NIOSH provided during a previous HHE conducted at this plant.

On April 9, a closing meeting was held with union and management representatives to review NIOSH activities and discuss the preliminary findings and recommendations. Activities conducted after the site visit included a further review of MSDSs and a review of personal medical records.

RESULTS

Medical

Interviews and Skin Examinations

Voluntary, confidential interviews were offered to 19 employees from all three shifts who had presented to the employee health unit between January and April 1996 for potentially work-related dermatologic problems. Sixteen of the 19 were interviewed; three workers were not available at the time of the interviews. In addition, two employees who had an onset of skin problems in 1993/1994, and four employees with dermatologic or other health concerns who were not on the employee health unit's list, were also interviewed and examined. Thus, a total of 22 workers were interviewed and offered skin examinations. Skin examinations were conducted for any worker who stated that he/she currently had an active or resolving skin condition.

The 22 employees who were interviewed came from a variety of departments in the plant--10 employees from Department 634, 3 from 622, 2 from 654, 2 from 640, and 1 each from 675, 623, 621, 661, 673. They also included a variety of job titles--eight were floaters, three were press operators, two were fork lift operators, and one each of miscellaneous day work, janitor, production, table worker, metal prep, quality control, mold operator, spray machine operator, and maintenance. Of the interviewed employees, 12 were male and 10 female, with a mean age of 38 years (range 25 to 58). The mean years employed at BTR was 8 years (range 0.5 to 33).

Twenty-one employees described dermatologic symptoms that they felt were work-related. One other worker described possible work-related throat irritation. Of the 21 workers with skin problems, 17 had sought medical treatment for their conditions. Most had reported to the employee health unit and had then been referred to a local dermatologist for further diagnosis and treatment.

For the 17 workers seen by a physician for their skin problems, the final diagnoses were varied and included nonspecific dermatitis (3 workers), irritant contact dermatitis (2), nummular dermatitis (1), irritant or allergic contact dermatitis (1), dyshidrotic eczema (1), lichen simplex chronicus (1), urticaria (1), blister (1), rosacea (1), alopecia areata (1), furuncles (1), urticarial vasculitis (1), nummular psoriasis (1), and psoriasis (1).

Of the 21 employees with a history of skin problems, the distribution of the skin eruptions were also varied (Table). The hands and arms, alone or in combination with other parts of the body, were most often affected. The face, trunk, legs, and scalp, alone or in combination with other parts of the body, were also affected. There was no distinct pattern to the distribution of the skin problems.

Exposures that the employees subjectively associated with the onset of skin conditions included unknown exposures (8 workers), oils (4), sprayer (2), paint lacquer (1), cleaner (1), heat (1), soap (1), adhesive (1), dust (1), and solvents (1).

Most employees used gloves regularly. The types ofgloves used included cotton cloth (10 workers), cotton and nitrile (4), rubber (1), nitrile (1), and 3 reporting using no gloves, and 3 used an unknown type.

Of the 21 employees with a history of skin problems, 17 continued to have current or resolving skin problems at the time of the site visit. Skin examination at the time of the site visit resulted in the following findings: mild dermatitis (4 workers); rosacea (3); post-inflammatory hyper pigmentation (2); folliculitis (2); nummular dermatitis (1); scattered non-specific papules (1); alopecia areata (1); psoriasis (1); lichen simplex chronicus (1); and, urticarial vasculitis (1).

OSHA 200 Logs

OSHA 200 logs were reviewed for the time period January 1, 1991, to April 4, 1996. Of all OSHA 200 entries, the percentage attributed to skin diseases or disorders by year is as follows: 1991- 6.6% (4 skin entries of 60 total entries); 1992 - 4.7% (5 of 107); 1993 - 7.5% (7 of 93); 1994 - 8.0% (9 of 113); and, 1995 - 5.2% (5 of 96). From January 1 to April 4, 1996, there were a total of 35 entries, of which 6 (17%) were for skin diseases or disorders.

Medical Records

Medical records were reviewed at the plant for 21 workers. In addition, personal medical records were reviewed for one employee. These records verified the reported dermatologic diagnoses of the workers (as listed above).

Environmental Observations

The major focus of the environmental survey was to evaluate whether appropriate changes had been made to address the recommendations NIOSH provided during the previous HHE. Most of the recommendations had been addressed, but a few had not.

The company has made several changes to try to improve labor-management communications. A more standardized system of medical surveillance has been established to better characterize and evaluate reported health effects, specifically dermatologic problems. Also, a joint labor-management health and safety committee was formed in May 1995. The committee consists of six union members appointed by the local union president and six management representatives. Meetings are held twice a month; one of these meetings includes a safety tour of the plant. There are now four avenues an employee can follow to report health or safety concerns--(1) an employee can approach the committee, (2) an employee can submit an anonymous or signed hazard report, (3) an employee can submit an anonymous or signed near miss report, and (4) an employee can submit safety suggestions. All submitted reports are to be addressed within 10 days. Another newly-formed committee is the joint labor-management ergonomic task force. This group meets weekly--twice a month for training and twice a month to evaluate specific processes. Using outside resources, this group is trying to develop its own ergonomic program to evaluate and redesign processes with employee and supervisor input.

Two unfavorable practices were noted during the previous HHE and were observed again during this survey. These included the following: (1) the use of cotton gloves by workers exposed to oils or solvents, and (2) wearing music headsets instead of hearing protection in designated high noise areas. The availability of non-cotton gloves was improved compared to the last survey. Several types of impervious gloves are now available throughout the work areas.

The local exhaust ventilation (LEV) systems in Department 634 (Toyo) had not been evaluated or

improved as was recommended during the previous NIOSH survey. According to informal interviews with the employees, the vapors from the flat and inside sprayers, and the fumes from the presses, remained the sources of major complaints. A smoke tube was used to visualize the air flow patterns where the painted parts exit the flat sprayer. At a distance of two to three inches from the exit, air is not drawn into the enclosed, ventilated spray area. Up to two workers stand in this location, and they reported experiencing burning, tearing eyes, and feelings of dizziness or drunkenness as the shift progressed. Although the operation itself is enclosed and ventilated, the hot, freshly sprayed parts and their racks exit the sprayer into the work area that does not have any LEV. Another recurring problem at this machine is that employees leave the side access door open, which interferes with the proper operation of the LEV. The adhesives used in the sprayers are mixed in an area that does not have any LEV, and employees reported dizziness and headaches resulting from this process.

Complaints were also voiced concerning three unventilated molding operations in Department 644 (domestic molding), which were not evaluated during the previous HHE. Also, a mold releasing agent of concern to employees is used in Department 644. When operators spray the mold releasing agent with a pneumatic spray gun, a mist is generated that drifts from the back of the mold presses into the next walkway. Employees reported that they often walk through this mist, unaware that an operator is spraying mold release in the next aisle. This mist irritates their eyes, nose, throat, and lungs, and gives them a shortness-of-breath sensation. They also reported that a request had been made to enclose the back and sides of the presses with curtains or panels so that the mold release cannot drift out the back side.

Air monitoring data from both Departments 634 and 644 suggest that no single exposure exceeds permissible limits. However, review of MSDSs reveals that most of the chemicals and by-products are irritants and some are potential sensitizers. Employees are exposed to mixtures of numerous irritants, the combined effect of which cannot yet be quantitated or evaluated clearly.

Two employees were observed inside the enclosure of the cushion spray paint machine in Department 634. The company had been experiencing problems with the LEV on this machine because the filters were becoming clogged with paint, and apparently these two workers were conducting maintenance/repair. Nevertheless, they had entered an enclosed space without performing any confined space entry procedures.

Last summer, the company instituted a safety stamp program whereby departments are issued a certain number of stamps each month based on injury/incidents rates--four stamps for no injuries and fewer stamps depending on the rates. The stamps can then be used to purchase items from a catalog. Workers report that this incentive program has resulted in employees not reporting all injuries/incidents.

DISCUSSION

Because of the multiple diagnoses and the multiple exposures, this discussion will emphasize a general overview of occupational skin diseases. In addition, because 9 of the 17 workers had skin diagnoses related to a variety of forms of dermatitis (this includes dyshidrotic eczema and lichen simplex chronicus), this entity will be emphasized here.

Occupational skin diseases can manifest themselves in a variety of ways. These include--contact dermatitis [cd], which includes irritant contact dermatitis [icd] and allergic contact dermatitis [acd]; skin cancers; skin infections; skin injuries; and a large group of miscellaneous skin diseases [such as folliculitis/furuncles, acneform dermatoses (chloracne), urticaria (systemic and contact), benign neoplasias, photo dermatitis, pigmentary disorders, connective tissue disorders, climatic disorders (miliaria rubra/prickly heat, asteatotic eczema/winter eczema), granulomatous dermatoses, ulcerative lesions, alopecia, and discoloration of hair, skin,

nails.] Many references on occupational skin disorders are available.[1, 2, 3]

Not all skin diseases have an identified environmental or occupational cause. For many skin diseases the exact factors causing the disease are unknown (e.g., psoriasis, alopecia areata, rosacea, urticarial vasculitis). Some diseases such as cd and contact urticaria are known to be caused by exposures in the work and/or non-work setting (e.g., cd to household products, perfumes, creams). Other skin diseases may not be caused by these environmental exposures, but may be exacerbated by such exposures (e.g., lesions of psoriasis produced at sites of skin friction or injury, heat exacerbating rosacea, wet work initiating dyshidrotic eczema).

In general, the causes of occupational skin disorders can be grouped into the following general categories:

1. Physical insults (friction, pressure, trauma, vibration, heat, cold, variations in humidity, ultraviolet/visible/infrared radiation, ionizing radiation, and electric current).
2. Biologic causes (plants, bacteria, fungi, protozoa, and arthropods).
3. Chemical insults (water, inorganic acids, alkalis, salts of heavy metals, aliphatic acids, aldehydes, alcohols, esters, hydrocarbons, solvents, metalloorganic compounds, lipids, aromatic and polycyclic compounds, resin monomers, and proteins).

Cd is the most common occupational skin disease. Epidemiologic data show that cd makes up 90-95% of all occupational skin diseases.[4, 5, 6] Cd (both irritant and allergic) is an inflammatory skin condition caused by skin contact with an exogenous agent or agents, with or without a concurrent exposure to a contributory physical agent (e.g., ultraviolet light). It is widely accepted that of all cd, 80% is due to a nonimmunologic reaction to chemical irritants (icd) and 20% to allergic reactions (acd). Icd is a cutaneous inflammation resulting from a direct cytotoxic effect of a chemical or physical agent, while acd is a type IV, delayed or cell-mediated, immune reaction. Any chemical, in sufficient concentration and under the right conditions, can cause irritation. Only certain chemicals are allergens, and only a proportion, usually small, of people are susceptible to them. Complete reviews of icd and acd are available in other sources.[1, 3, 7, 8]

In dermatitis, the skin initially turns red and can develop small, oozing blisters (vesicles), and bumps (papules). After several days crusts and scales form. Stinging, burning, and itching may accompany the rash. With no further contact the rash usually disappears in one to three weeks. With chronic exposure, deep cracking (fissures), scaling, and discoloration of the skin (hyper pigmentation) can occur. Exposed areas of the skin, such as hands and forearms, which have the greatest contact with irritants or allergens, are mostcommonly affected. If the chemical gets on clothing, it can produce rashes at areas of greatest contact, such as thighs, upper back, armpits, and feet. Dusts can produce rashes at areas where the dust accumulates and is held in contact with the skin, such as under the collar and belt line, at the tops of socks or shoes, and in flexural areas (e.g., front of the elbow, back of the knee). Mists can produce a dermatitis on the face and anterior neck. Irritants and allergens can be transferred to remote areas of the body (such as the trunk or genitalia) by unwashed hands or from areas of accumulation (such as under rings or in between fingers). It is often impossible to clinically distinguish icd from acd, as both can have a similar appearance and both can be clinically evident as an acute, subacute, or chronic condition.

Extensive lists of irritants and allergens are available in reference books.[1, 7] The most frequent causes of icd include soaps/detergents, fiberglass and particulate dusts, food products, cleaning agents, solvents, plastics and resins, petroleum products and lubricants, metals, and machine oils and coolants.[6, 9] Causes of acd include metallic salts, organic dyes, plants, plastic resins, rubber additives, and germicides.[9] In one study of acd involving 5046 patch-tested patients, the most common allergens were nickel, thimerosal, neomycin, formaldehyde, paraphenylenediamine, quaternium-15, thiuram mix,

balsam of Peru, cinnamic alcohol, ethylenediamine, cinnamic aldehyde, carba mix, mercapto mix, and potassium dichromate.[10] In patients with occupational cd, the common allergens included mercapto mix, mercaptobenzothiazole, rosin, thiuram, paraphenylenediamine, and epoxy resin.[10] In a Belgian study of over 2000 patients with occupational cd, the most frequent allergens were nickel, chromate, paraphenylenediamine dihydrochloride, cobalt, epoxy resin, thiuram derivatives, and black rubber mix.[11]

The work-relatedness of skin diseases may be difficult to prove. The accuracy of the diagnosis is related to the skill level, experience, and knowledge of the medical professional who makes the diagnosis and confirms the relationship with a workplace exposure. Guidelines are available for assessing the work-relatedness of dermatitis,[12] but even with guidelines the diagnosis may be difficult. The diagnosis is based on the medical and occupational histories and physical findings. The importance of the patient's history of exposures and disease onset is clear. In icd there are no additional confirmatory tests. Patch tests or provocation tests are discouraged because of a high false-positive rate. In many instances, acd can be confirmed by skin patch tests using specific standardized allergens or, in some circumstances, by provocation tests with nonirritating dilutions of industrial contactants.[7] Patch testing is less than the ideal gold standard; its sensitivity and specificity are about 70%, with a 50% relevance (predictive value positive) for positive tests (i.e., in half the cases the chemical inducing a patch test response can be established as the cause of the patient's present or past skin condition).[13] The lack of a standard case definition and the difficulty of diagnosis lead to potential misclassification of occupational cd, resulting in over or underestimation of disease frequency. An example of the guidelines to determine work-relatedness of dermatitis follow:[12]

1. Is the clinical appearance consistent with contact dermatitis?
2. Are there workplace exposures to potential cutaneous irritants or allergens?
3. Is the anatomic distribution of dermatitis consistent with cutaneous exposure in relation to the job task?
4. Is the temporal relationship between exposure and onset consistent with contact dermatitis?
5. Are nonoccupational exposures excluded as probable causes?
6. Does dermatitis improve away from the exposure to the suspected irritant or allergen?
7. Do patch tests or provocation tests identify a probable causal agent?

Because people with cd can develop long-term dermatologic problems, prevention is key. Strategies in the prevention of cd include identifying allergens and irritants, substituting chemicals that are less irritating/allergenic, establishing engineering controls to reduce exposure, utilizing personal protective equipment (PPE) such as gloves and special clothing appropriately, emphasizing personal and occupational hygiene, establishing educational programs to increase awareness in the workplace, and providing health screening.[6, 19, 14] The introduction of PPE must be considered carefully since it may actually create problems by occluding allergens or irritants or by directly irritating the skin. Similarly, the excessive pursuit of personal hygiene in the workplace may actually lead to misuse of soaps and detergents, which can result in icd.[15] The effectiveness of gloves depends on the specific exposures and the types of gloves used. The effectiveness of barrier creams is controversial,[16] and at times workers using barrier creams may have higher prevalence rates of cd compared to those who do not use the creams.[17]

CONCLUSIONS

No specific explanation for the relative increase in skin problems among BTR employees was found. Based upon the variety of departments and job titles involved, the varied diagnoses and distributions of the skin problems, and the variety of reportedly associated exposures, it is unlikely that all the cases are related to one single exposure or work practice. The environmental survey and review of MSDSs revealed that workers at BTR have potential

exposures to multiple known skin irritants and allergens, including but not limited to rubber products, adhesives, mold releasing agents, polymeric resins, petroleum hydrocarbon oils, solvents, and soaps and cleansers.

RECOMMENDATIONS

1. In general, a combination of the following strategies should be used to prevent occupational skin diseases at the BTR plant:
   a) Identifying irritants and allergens in the workplace.
   b) When feasible, and considering systemic as well as dermatologic toxicity, substituting chemicals that are less irritating/allergenic.
   c) Establishing engineering controls to reduce skin exposure.
   d) Utilizing PPE such as gloves and special clothing (item 3 below).
   e) Emphasizing personal and occupational hygiene (item 4 and 5 below).
   f) Establishing educational programs to increase employee awareness of irritants and allergens in the workplace.
   g) Providing a system for the evaluation, reporting, and surveillance of dermatologic diseases (item 2 below).

2. Workers should be encouraged to continue to report all possible work-related skin problems. These problems should be investigated on an individual basis by the company and consulting health care providers. Because the work-relatedness of skin diseases may be difficult to prove, each person with possible work-related skin problems needs to be fully evaluated by a physician, preferably one with expertise in occupational/dermatological conditions. A complete evaluation would include a full medical and occupational history, a medical exam, a review of exposures, possibly diagnostic tests (such as skin patch tests to detect causes of acd), and complete follow-up to note the progress of the individual. Individuals with definite or possible occupational skin diseases should be protected from exposures to presumed causes or exacerbators of the disease. In some cases, workers may have to be reassigned to areas where exposure is minimized or nonexistent.

3. Skin should be protected from contact with irritants and allergens (sensitizers) with proper PPE such as clean gloves, protective coveralls, and sleeve protectors. Glove selection should be based on information in the specific MSDSs and other guidelines. In the processes where contact with a variety of petroleum hydrocarbon oils occur, the practice of using cotton gloves should be discontinued or modified. Cotton gloves only serve to absorb the oils and wick these irritants onto the skin surface. If the dexterity of an outer cotton glove is beneficial to the worker, then the skin should be protected with an inner layer of an appropriate impervious glove (such as polyethylene, nitrile, polyvinyl chloride, neoprene, or polyvinyl alcohol, as appropriate). A thin cotton glove beneath the impervious glove may be helpful to wick away sweat buildup. However, special attention must be directed to assuring that the inner glove does not become saturated with oil.

4. Irritants and allergens that have come in contact with exposed skin should be washed off with soap and water as soon as possible. Residual soap should be washed off the skin surface. Special attention should be directed toward soaps and skin cleansers since they themselves can serve as irritants. Certain components of the soaps or moisturizers (e.g. lanolin and fragrances) are known allergens and may cause acd in sensitive individuals.

5. Clothing contaminated with irritants or allergens should be removed and laundered prior to re-use.

6. Although air monitoring data suggest that no single exposure has exceeded permissible limits, workers are still exposed to a large number of chemicals that are respiratory or mucosal irritants. Employees are exposed to mixtures of

numerous irritants, the combined effect of which cannot yet be quantitated or evaluated clearly. Since during the environmental survey, workers reported symptoms such as headaches, dizziness, nausea, and burning or watering eyes, improving the LEV or general ventilation systems should be considered. For instance, the flat sprayer in Department 634 does not appear to have sufficient LEV. Also, since the building is negatively pressurized in the winter, and some exhaust stacks can act as passive intakes when they are not operating, the general ventilation may need to be improved.

7. There is a discrepancy in the rationale for which machines have LEV systems. For example, the mold presses in Department 644 all have LEV except for three machines, but similar presses in Department 634 do not. BTR could address this ventilation discrepancy in a variety of ways, such as educating and communicating with employees the reasons why LEV is not necessary or feasible, installing LEV, or working with employees to find a compromise solution that might reduce symptoms of irritation.

8. The safety engineer should evaluate the work practices and short-term exposures when Department 634 employees mix the adhesives for the inside and flat sprayers. Since employees report irritative symptoms associated with this process, perhaps the work practices could be altered, the process redesigned, or LEV installed to minimize exposures.

9. The safety stamp program does not appear to be functioning as it should. If workers cannot be convinced that all injuries/incidents need to be reported so the company can address health and safety problems, then the program should be discontinued.

10. The back and sides of the mold presses where mold release is sprayed with a pneumatic gun should be enclosed with curtains or panels. This should prevent the irritating mist from drifting into the next aisle.

11. Entry into confined spaces is regulated because it is dangerous. Employees need to be made aware of the regulations and procedures concerning confined space entry.

12. Personal radio headsets do not offer hearing protection for the wearer and therefore should not be allowed in place of hearing protection (HP) in areas were HP is required. A recent development has resulted in the marketing of an earmuff with a gain-limited FM radio built into the muff so that workers can have protection from noise and still listen to radio programs while working.

13. Continue to improve the health and safety programs and try to use the joint labor-management health and safety committee as a tool to improve communication and trust between employees and management.

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Table 1
Self-reported Distribution of Skin Problems by 21 BTR Employees
BTR Antivibration Systems, Inc.
HETA 96-0098

Arms	*Hands*	*Face*	*Trunk*	*Legs*	*Scalp*	*# Workers*
+	-	+	-	-	-	3
+	+	-	-	-	-	2
+	-	-	-	-	-	2
-	+	-	-	-	-	2
-	+	-	-	+	-	2
-	+	+	+	-	-	1
-	+	+	+	+	-	1
-	-	-	+	-	-	1
-	-	+	-	-	-	1
-	-	-	-	-	+	1
-	-	-	-	+	-	1
+	-	-	+	+	-	1
-	-	+	+	-	-	1
+	-	-	+	-	-	1
+	+	+	+	+	+	1
10	9	8	7	6	2	

Delivering on the Nation's promise:
Safety and health at work for all people
Through research and prevention