SESSION EIGHT:
WORKERS IN FISH PROCESSORS

Gloves and boots drying in Norway (Photo courtesy of R. Evans and B. Bang)

WORK ENVIRONMENT AND HEALTH IN THE SEAFOOD-PROCESSING INDUSTRY IN NORTHERN NORWAY

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Introduction

The seafood processing industry is the second largest export industry in Norway. Thus, the industry plays a very important role in the cultural and economic life of coastal Norway. Percentage of days lost to sick leave in the fisheries industry for office personnel was 4% in 1998 and 1999, as opposed to 12% and 11% for production workers for the same years (Bang et al. 2000). Yet little information has been published on the relationship between working environment and worker health. Information on preventive measures and the feasibility of such measures is also lacking

Since 1999, senior researchers of the Department for Occupational and Environmental Medicine at the University Hospital of Northern Norway have led a series of projects on seafood processing plants in northern Norway (Bang et al. 2000; Bang and Aasmoe 2002). These projects are being funded in part by the Confederation of Norwegian Business and Industry. The goals were to obtain hard data and specific knowledge of the work environment and worker health in the seafood processing industry and return the knowledge acquired back to that industry. The strategy chosen was to do a series of studies, refine the areas of interest and methods used, and present the results to industry.

This paper focuses on the development of input to the industry. Articles presenting hard data and results are in preparation and will be published elsewhere (Bang et al. ; Aasmoe et al.).

Methods

The series of studies included a literature review, pilot study, main study, and presentation of findings to industry. The literature review pointed out both probable environmental factors and health effects of interest. Environmental factors include noise, thermal environment (Kuklane 1999), finger temperature (Halkier-Sørensen and Thestrup-Pedersen 1991), air quality (Orford and Wilson 1985; Malo et al. 1988; Douglas et al. 1995; Jeebhay et al. 2000), contact with seafood proteins (Schwartz and Tabershaw 1945; Kavli et al. 1985; Bjelland et al. 1989), repetitive movements, ergonomics, and work organization (Pålsson et al. 1998). Possible health effects were skin irritation, respiratory symptoms, allergy symptoms, hearing loss, and muscle and joint pain.

The pilot study was carried out in five whitefish processing plants. It included 356 returned questionnaires, including ones translated into Tamil, and a health study of volunteers on lung function, allergies, and general antibody level (IgE). The findings confirmed that cold, noise, heavy and/or repetitive work, organizational factors, irritative/allergenic exposure, and air quality are important factors in worker environment and health.

For the main study, a new questionnaire was designed and applied to whitefish, salmon, herring, and shrimp processing plants. Subgroups were formed to look at the following: skin and respiratory symptoms, musculoskeletal symptoms, thermal environment, and noise. As the project progressed, a subgroup was found to be necessary to look at the use of diesel- and propane-powered forklifts indoors and effects on air quality. Questionnaire results were used by all subgroups.

On-site data collection was carried out in two ways: environmental mapping at 17 (in some cases 19) plants and health studies of more than 220 volunteers. Environmental mapping included monitoring bioaerosols, mold, total microorganisms, endotoxins, exhaust gasses, noise levels, thermal environment (including information on the construction and heating of the plants, relative humidity, and ambient and worker temperatures), and 16 in-depth interviews on ergonomic and organizational aspects.

Health studies included spirometry and peak flow measurement series over 2 weeks, as well as the collection of blood samples for allergy tests.

Results: Return to the industry

The product returned to the industry was a folder and educational materials. The folder presents the findings in a constructive manner, i.e., as practical, and for the most part, low-cost measures that will better the working environment. The folder should be in use by early 2004.

Educational materials are being developed for use by industrial hygienists. The results for each of the main topics of interest—thermal environment, noise level, ergonomics, work organization, air quality—have been summarized with references. The plan is to test these materials in the field early in 2004. Information from all subgroups is included. Two of the main points we hope to share are that—

1. The total working environment and the interaction of factors must be considered. Suggestions for improvement must be economically feasible and be part of developing job security for the workers.
2. It is not unethical to point out that a good working environment quite often means a less expensive working environment in the long run. As an example, one may look at suggestions for improving air quality. These include—

   - Replace propane- or diesel-powered forklifts with electric forklifts.
   - Do not use ventilation systems that recycle air.
   - Enclose production areas where bioaerosols are formed, such as where high water pressure is used to peel shrimp.
   - Reduce the of likelihood of mold and bacteria growth by reducing water and waste spill and providing good ventilation.

Improved air quality also means that a better product and better worker health may ensue. Thermal environment is closely related to air quality and product quality. The thermal environment must be such that the seafood being processed is kept refrigerated, but the workers must not be so cold that they cannot do their work. Ambient temperature may also contribute to airway problems. Temperature will be influenced by the placement of heat sources, ventilation currents, loss of heat to evaporation of waste water, loss of heat to refrigerated areas and outdoors, and so forth. All of these factors

provide opportunities for improvement in most plants. Again, less spillage means less heat lost to evaporation, less risk of falls, better air quality, and possibly lower worker insurance rates and lower electricity bills.

How workers experience the working environment is definitely related to organizational factors. Cold workers hurt more. Job rotation can mean moving around and staying warm. Perception of the work environment is important. Knowing how best to do your job lessens muscle tension. Mentoring new employees by older, good workers seems to be a definite asset for all. The pleasure of good colleagues and a management that is responsive to workers aids a positive perception of the work environment.

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