

Hazards in the workplace

World at work: Aircraft cabin cleaning

S S M Yeung, I T S Yu, K Y L Hui

A look from the inside

Most of us have the experience of travelling on aeroplanes and are impressed by the cleanliness and orderliness of the cabin that welcome us together with the friendly and smiling faces of the aircrew every time we board an aeroplane. The cleanliness and orderliness of the cabin are the results of the hard work of heroes behind the scene—the aircraft cabin cleaners. The work of these cleaners seldom attracts our attention, and in fact, very few of us have directly met with them before.

Aircraft cabin cleaning is a unique type of cleaning work characterised by a high concentration of physical activities in time and space that are not fully under the direct control of the service providers and their workers. The confined workspace (due to maximisation of carrying capacities and comfort of passengers) and the tight work schedule (especially with short stay flights) are potential underlying risk factors for the development of musculoskeletal disorders among the cleaners. In this article, we describe the occupational health aspects of aircraft cabin cleaning at Hong Kong International Airport. Three major companies provide the cabin cleaning services for all aircraft in the airport, and the total number of workers employed is around 1200.

TASKS OF THE JOB

Airline companies usually contract out cabin cleaning to aircraft services companies. There are basically three levels of cleaning services for the aircraft: quick transit cleaning, overnight (lay-over) cleaning, and deep cleaning. The types of services rendered depend on the duration of stay of the aircraft at the airport. The tasks in a typical quick transit cleaning involve: (1) seat cleaning, (2) seat pocket cleaning, (3) ashtray cleaning, (4) galley cleaning, (5) toilet cleaning and replenishment, (6) floor cleaning, and (7) blanket management. Lay-over cleaning is more thorough and in addition to the above processes includes: (1) floor vacuuming, (2) window cleaning, (3) stowage cleaning, and (4) cleaning of the cabin crew resting area. Deep cleaning includes all the above tasks but in a more extensive manner.

Work organisation

A team leader is responsible for the delegation of duties. The number of cleaning crews (each with 5–6 members) assigned to each aircraft depends on the type of aircraft and the type of service required (quick transit, lay-over, or deep cleaning). On average, 6–8 crews are needed for a large aircraft (747-400), 3–4 crews for a medium size aircraft (747/757/767/330/MD11/DC10), and 2 for a small size aircraft (320/321/737). The crew members normally change their work tasks and class of service (first, business, and economy) every week. Table 1 summarises the work organisation for the three types of services. Assignment of duties for members of the cleaning crew is usually as follows:

- 1 member—toilet cleaning and replenishment and then floor cleaning
- 1 member—ashtray cleaning and then blanket management
- 1 member—galley cleaning and then seat pocket cleaning
- 2 members—seat cleaning and seat pocket cleaning.

Each crew in the daytime has to complete about 7–8 cycles of cleaning tasks. Not infrequently, the cleaners have to stay in transport vehicles on the ramp for standby in order to save transportation time from the depot to the aircraft parking lots. For an overnight shift, around three cycles of cleaning tasks per crew are assigned. The majority of workers are middle-aged women. The 20% male workers are responsible for the loading and unloading of heavy/large cabin items (for

example, newspaper) and garbage disposal.

HAZARDS OF THE JOB AND IN THE WORKPLACE

The main hazards of the job are related to ergonomics, and the tight working schedule and congested workspace underlie most of the hazards.

Layout of the workspace

Space on board aircraft is precious, and the working space for cleaners to perform their tasks is usually restricted and very limited. Depending on the type of aircraft and seating class, aisle width varies between 46 and 60 cm, space between rows (from back of seat to edge of seat in the next row) varies between 24 and 50 cm, and the stowage height varies between 170 and 203 cm. The working space inside toilets is typically small, at a maximum of around 70 by 100 cm.

Ergonomic task analysis and evaluation

We have used the Ovako Working Posture Analysis System (OWAS)¹ to estimate the frequency and repetitiveness of various body postures when performing the cleaning tasks and made a total of 3464 observations. The results of the posture analysis indicate that some job tasks require special attention: seat front/footrest floor cleaning and vacuuming, galley cleaning, and lavatory cleaning.

Seat front floor cleaning and vacuuming

Floor cleaning and vacuuming is considered to be one of the most physically demanding tasks for lay-over cleaning. To perform the task, each worker has to carry a vacuum cleaner (~6 kg) on the back (fig 1A). Two shoulder straps and one waist strap are provided to secure the vacuum cleaner. As workers have to work in the narrow aisle and space between rows, and very often need to give way to other workers, it is not unusual for the workers to secure the cleaner with unnatural postures (fig 1B) that may induce unnecessary stress to the shoulders and the back. For the seat

Table 1 Work organisation of cabin cleaning services

Type of service	Type of aircraft	Number of crews	Time required to complete the service
Quick transit	Small	1–2	12–20 min
	Medium	3–4	30 min
	Large	6	40 min
Layover	Large	6–8	45–90 min
Deep cleaning	Large	6–8	3.5 h



Figure 1 Vacuum floor cleaning.

front/footrest cleaning and vacuuming task, the situation becomes more difficult as the workers have to lift up the footrest and stretch the hose or the sweeper into the seat front to clean the floor. Indeed, postural analysis revealed that working with the back in a forward flexed position constituted up to 81% of all the back postures. Figure 2 shows typical work postures of this task.

Galley cleaning

Galley cleaning involves tidying up and cleaning of the workbench of the galley, food cart, storage cupboards, and coffee



Figure 2 Seat front cleaning.

shelves, and cleaning of the floor surface. Back forward bending (39% of the time) and arms at or above shoulder level (10% of the time) are the common work postures. The workers also have to squat down frequently to perform the task (24% of the time). Figure 3 shows the typical work postures.

Lavatory cleaning

Owing to the limited working space inside the lavatory (average 50×70 cm, width by depth), the worker has to adopt very awkward and unnatural postures when working. Squatting (25%) and forward bending of back (47%) are common postures observed in this activity. Figure 4 shows a typical work posture.

Musculoskeletal problems

Cabin cleaning work is quite physically demanding and associated with some high risk postures and high risk activities. In fact, a survey of cabin cleaning workers of a major contractor in Hong Kong found one sixth of them had experienced occupational injuries in the past and about one third of them experienced bodily discomfort during and after work in the seven days before the interview. The main areas affected were: back, elbow, shoulder, neck, knees, and wrists and hands.

In addition to the major problems associated with working postures and working pace, cabin cleaners are also subjected to other health hazards in the workplace.

Physical hazards

Noise exposure can occur when they are staying in the ramp area on standby. Noise from vacuum cleaners may also post a hazard if they are not properly maintained. High temperature can be a problem during the summer season if the air-conditioning system of the aircraft is turned off during cleaning.

Chemical hazards

Common household cleansing agents are used for cleaning various surfaces and the toilets; some of them may contain chemical irritants that are harmful to the skin of the workers. Some airline companies require "disinsection" (spraying of residual insecticide) of aircraft on certain international flights. Although professional pesticide sprayers equipped with personal protective equipment do the spraying, cabin cleaners may still be affected by the residual insecticides if they are forced to enter the cabin (due to the tight time schedule) to perform cleaning duties without an adequate washout period being allowed for. The pesticides used belong to the pyrethroid class of

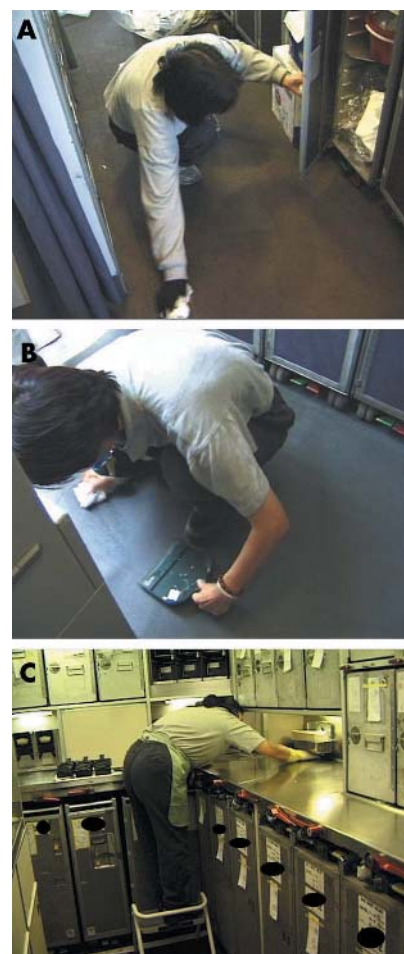


Figure 3 Galley cleaning.

compounds and should usually present no major harm to humans except for subjects with hypersensitivity. However, many pesticides also contain organic solvents, and the residual concentration without an adequate washout period may pose a hazard to the cabin cleaners.

Psychosocial hazards

Night work and shift work, sometimes with irregular hours, is part and parcel of cabin cleaning work, and may result in sleep disturbance, social isolation, and other undesirable psychosocial consequences.

MEASURES TO PROTECT WORKERS

As the constraint of the workplace probably contributes most to the poor working postures of the workers, the best solution should stem from the redesign of the workplace. This necessitates modification and redesign of the aircraft seat plan and space, and should be brought to the attention of cabin designers. From the perspective of the cabin cleaning contractor, the strategies to be adopted for reducing stressful



Figure 4 Toilet cleaning.

postures include: administrative measures, provision of ergonomic aids, and training and education of the workers.

Administrative measures

Cabin cleaning is composed of tasks with different levels of physical exertion; the management should consider a good mix of tasks assigned to each individual worker, such that the amount of stressful work postures can be reduced by combining less physically demanding tasks with high demand tasks. It may be worthwhile to consider a systematic daily job rotation scheme. The scheme should be formulated according to the demands of each work task and the time that the workers would be exposed to the same demands, such as "stressful positions" of the back or upper limbs. An example may be: galley cleaning (high risk) → seat cleaning → lavatory cleaning (high risk) → window and stowage cleaning → floor cleaning and vacuuming (high risk). Such a scheme can minimise the continuous exposure of a worker to a particular stressful position within a work shift.

As many of the work related musculoskeletal injuries are cumulative in nature, early reporting of problems will

enhance ratification and recovery. Policies and procedures for reporting problems/injuries should be made clear to all staff members and such reports should be closely monitored. Regular surveys on the feedbacks from workers should be conducted to evaluate the effects of changes made or solutions introduced to ameliorate the problems.

Provision of ergonomic aids

The management should consider possible use of ergonomic aids to reduce the chances of stressful postures. For instance, a tool that can assist in lifting up the footrest (in first or business class) could be beneficial by reducing the frequency of forward bending position. Using a tool with a long handle may also help to reduce stress when cleaning footrests. The vacuum harness/straps may need to be redesigned such that the vacuum cleaner can be secured appropriately on the back and the shoulders while working in different working postures.

Training and education of the workers

While training in itself should not be regarded as a substitute for job redesign or the use of ergonomic aids, it should be an integral part of the whole preventive strategy. As the effects of stressful postures are likely to be cumulative, the cabin cleaners should be educated about the concept of good postures, and the supervisors should be given the responsibility of reminding their subordinates of the proper ways to perform the tasks. It is also recommended to institute regular breaks and regular in-house exercise classes during the break or lunchtime in order to engage workers in structured stretching exercises for reinforcing the prevention component at the workplace. Train the trainer

approach can be adopted, and the team leaders should receive proper training in occupational health and safety related to the job.

Prevention of other hazards

Regular maintenance of vacuum cleaners may help to cut down noise generation, and better insulation of transportation vehicles will also help to reduce noise exposure while workers are staying on the ramp. Rubber and/or plastic gloves should be worn when handling chemicals or cleaning with chemicals, and the cabin should be adequately ventilated with fresh air after pesticide spraying before cabin cleaners are allowed to work inside.

Medical surveillance

It is worthwhile to have regular medical surveillance, which may be in the form of a standardised questionnaire, for detecting and monitoring the work related health problems of the employees.

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