

# The Need to Study the Fitness and Work Capacity of Factory Workers in Hong Kong.

## 研究香港 工廠工人的體適能 和工作能力的 需要

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透過現今先進的實驗器，不難找出個人在各項運動中的能量消耗。這些量度得來的資料有助了解和評核運動員的身體和體能狀況。同樣，對工廠工人來說，亦可以利用類似的測試和量度來評定他們的體適能在工作上的要求。早期的研究顯示工人的生產力和身體健康跟其本身體適能和工作的勞動量有關。其他的研究亦建議體適能良好的工人擁有較佳的生產力。為了能夠進一步了解香港在不同工廠行業中工人的體適能及工作勞動量的實際水平，從而獲得更多職業培訓及諮詢方面的參考數據，研究計劃確有實行的必要。

### Introduction

With modern laboratory instruments, it becomes feasible to measure the energy requirements of various sports activities. Such knowledge enables accurate assessment of athletes' condition and progress as well as prediction of performance. Along a similar line, Wells et al. (1957) utilized the worker's physiological parameters such as heart rate, oxygen uptake, and respiratory quotient to classify work into three categories - light, heavy, and severe. Astrand and Kaare (1977) indicated that one could not tax more than 30 to 40 percent of one's maximal oxygen uptake during an 8-hour working day without developing symptoms of fatigue. Thus, it seemed that the overall work productivity and health of a worker was dependent on his/her fitness and the requirement of his/her work (in terms of energy requirement). Sharkey (1987) supported this contention and suggested that job-related tests would be more desirable than using chronologic or functional age to determine one's ability to perform on any job. This was concurred by Shephard (1987) who felt that some older workers could easily meet the energy requirement of their job even after they passed their retirement age. Ilmarinen et al. (1978) suggested that in a self-paced job where 40% ceiling of aerobic power has been reached, a 10% increment of maximum oxygen uptake would allow a 10% improvement of productivity. Their findings were supported by Pravosudov (1978) who indicated that other things being equal, worker athletes had a higher working capacity of 2-5% and sometimes 10-15% higher than nonathletes. Since a number of researches pointed out the importance of fitness and actual work energy requirements on eventual job performance, it would be highly desirable to have knowledge of the energy requirements of various jobs in different manufacturing industries for reference in job counselling and placement.

### Related research

Kannel et al. (1986) indicated that much of the atherosclerotic cardiovascular disease during the past 25 years was a product of too rich a diet, too little exercise, too much body fat, and too much smoking. He suggested that an active lifestyle would decrease the overall cardiovascular and coronary mortality. Wiley and Camacho (1980) identified five health practices with a favourable influence on mortality and they were: (1) being a nonsmoker; (2) drinking 17-45 alcoholic drinks per month; (3) sleeping 7-8 hours per day; (4) deviating from ideal body weight by -10 to +29%; and (5) participating in moderate to heavy leisure activity. The welfare of the workers was first recognized by the formation of the Industrial Health Research Board in England in 1918 with the main

objectives to "consider and investigate the relationship of the hours of labour and of other conditions of employment; including methods of work, to the production of fatigue, having regard both to industrial efficiency and to the preservation of health amongst the workers". Work related stress was also investigated by Colligan et al. (1986) and Wangenheim et al. (1987). Various measures were suggested to improve lifestyle, health practice, working environment, and productivity.

In a review on the roles of exercise in health maintenance and treatment of disease in middle and old age, Holloszy (1990) indicated that with the majority of epidemic and endemic infectious diseases and nutritional deficiencies under control in the developed countries, the proportion of elderly people in the population would increase drastically. Judging from epidemiological data and related evidence, he concluded that regular exercise could slow the decline in functional capacity and protect against the development of major chronic disease associated with aging.

Itoh and Okuse (1990) conducted a longitudinal study with sedentary workers. They found that regular exercise programmes would prevent a significant decline in their physical abilities as compared to those who did not exercise regularly. Aoki et al. (1990) in a study with 377 Japanese workers, found significant correlations between risk factors for cardiovascular disease and fitness variables. Maximum oxygen uptake has a negative relationship while percent body fat has a positive relationship with these risk factors.

Runtenfranz et al. (1990) in their investigations with factory workers, concluded that the maximum aerobic power should be two to three times the level of the energy expenditure required in their work phases. Energy expenditure in relation to limiting peak loads should be 30 percent with jobs with no rest pauses, and 50 percent for those with rest pauses.

Howard and Michalchki (1979) presented the mechanisms whereby an exercise programme could modify productivity. They identified health, attitude, and energy level of subjects as the three major factors. Local researches conducted by the Industry Department were directed toward improving various infra-structures and the technical support and skill of various industries. The Hong Kong Productivity Council undertook 1,050 consultancy projects in 1991-92, including feasibility studies, production management, new plant projects, environmental management, quality management, product design and development, and industrial automation services (Roberts, 1992). There was, however, no research which investigated the fitness and health of factory workers using applied work physiology and health practice and lifestyle assessment.

## Objectives

Despite the crash in the stock market in October, 1987, the value of Hong Kong domestic exports increased 27 percent more in 1987 than in 1986. While most countries were suffering from a mild recession in 1992-93, Hong Kong's economy was growing and has to import outside labourers in specific trades. Among the many factors which contributed to Hong Kong's success as a leading manufacturing and commercial centre in the world, the most important one seemed to be a flexible and industrious workforce" (Ismail, 1988). Over 26 percent of Hong Kong's total employment is in the manufacturing industries, which accounted for 16 percent of the gross domestic product (Roberts, 1992). In 1967, the Hong Kong Productivity Council was established to assist in improving the productivity of industry via training centres and courses. The Industry Department conducted regular studies on Hong Kong Main manufacturing industries. As of today, there are no studies which focus on the fitness, health, and productivity of factory workers. Since the Hong Kong workforce must continue to improve its adaptability and productivity over the years, there is an increasing need to have a better understanding in order to help maintain the competitive edge that has been achieved over the rest of the world. As the demands of various industries are different, it would be highly desirable to study the relationship between work capacity, energy requirements of specific manufacturing tasks, level of fitness, lifestyle, and health practice of Hong Kong factory workers. Knowledge of data from these areas would help us understand the present conditions of the workforce in these areas. From such findings, apparent weaknesses can be identified and intervention programmes can then be recommended.

In the years ahead, Hong Kong will face stiff competition from other Asian countries and the workforce must be kept at its peak efficiency and productivity. The methods of applied physiology in work performance are given credit for their success in producing world champions in sports. They can be applied, with equal success, to assess factory workers. Thus, the major objectives of the present study will be to better understand our workforce and the major factors in fitness, lifestyle, and health practice which affect the overall work productivity and efficiency. Through analyzing data in these parameters, interventions would be recommended. A follow-up study would be to investigate the effects of selective intervention measures to change the fitness, lifestyle, and health practice of local factory workers.

With a shortage of skilled labour in Hong Kong, companies are increasingly aware of the importance of employee's welfare and fringe benefits. By understanding the actual physiological demands of major industries in Hong Kong and their relation to fitness, health practice and lifestyle, it would help the employers in planning programmes to prevent undesirable burn-

out and turnover due to fatigue and poor fitness and to improve overall productivity, work capacity, and the quality of life of the worker. As more and more Hong Kong companies are building factories in China, it might be desirable to conduct a similar study, at a later stage, to compare the fitness level, lifestyle, and health practice of Mainland Chinese and Hong Kong factory workers.

## Conclusion

The success of Hong Kong as a leading manufacturing and commercial centre has been attributed to a simple tax structure, a flexible and industrious workforce, a modern and efficient seaport, a modern airport with computerized cargo terminal, a first rate communication system, and government commitment to free trade and enterprise (Ismail, 1988). The manufacturing industries, which account for 26 percent of the domestic employment, are the backbone of Hong Kong success story (Roberts, 1992). In order to maintain its leadership role and its ability to stay competitive with the rest of the world, Hong Kong's labour force will have to be skilled as well as adaptable to changes. Since Hong Kong will be facing stiff competition from its Asian neighbours in the future, it must now conduct research in order to better understand the local labour force.

The results of recent research indicated the importance of understanding the physiological functions and fitness as well as the health practice and lifestyle of the workforce in assessing productivity and efficiency. Having a minimum level of cardiovascular fitness will prevent undue fatigue and improve the overall work capacity of the factory workers. Together with an active lifestyle, the quality of life can be improved and this might contribute to a lower turn-over rate and better spirit and morale among them. If one can reduce the frequency of sick leave, the overall productivity of the factory will increase. The knowledge of good health practice is therefore also important. In Hong Kong, there is an increasing need to understand more about our workforce in order to improve productivity and to facilitate future planning. Future research in this area with blue-collar as well as white-collar workers will be imperative.

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