Theater Engineering Conference

Floor Coverings

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Vacuum Cleaning of Theaters*

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Summary—**This paper discusses the maintenance of soft floor coverings and its related subject, vacuum cleaning, and outlines the type of vacuum cleaners now available for theater cleaning, and their proper uses and maintenance, so that the carpets in theaters are always kept immaculately clean, the ever-present problem of the theater manager. Also it will attempt to show how expense in connection with the renewal of carpets and the cost of its maintenance can be held to a minimum by the use of properly designed vacuum-cleaning equipment.**

Deterioration in a carpet depends, of course, on the amount of traffic over its surface. The gradual thinning of the nap of the fabric is caused, however, mostly by imbedded sharp grit with nap-cutting action as the foot passes over the surface. Therefore, it is important that whatever cleaning medium is used it have sufficient power to remove the grit as well as the dust. For over 40 years the vacuum-cleaning industry has progressed steadily designing machines to meet the cleaning problems encountered in theaters. The problem today is that of selecting the vacuum-cleaning machine best suited to the specific need of the theater.

In considering vacuum cleaners, the first requirement is that it has to clean. Any other prevailing advantages it may have otherwise are worthless. Then we should consider the cost of labor, maintenance, power consumption, maneuverability, initial cost, and deterioration of the equipment. These are not listed in their proper sequence of importance, for what may be important to one manager may not be to another, but what is equally important to all is that there is an ever-present problem of cleaning the theater thoroughly, and to do so at a reasonable maintenance cost.

Basically there are several types of vacuum cleaners available, the stationary vacuum-cleaning system, commercial portable vacuum cleaners, and domestic portable vacuum cleaners.

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The stationary type, frequently referred to as the central or installed system, consists of a vacuum producer and dirt separator, both of which usually are located in or near the boiler room, with piping installed throughout the theater, having hose-connecting outlets so located that a porter using a 50-foot length of $1^1/_2$-inch diameter hose can reach and vacuum any part of the auditorium, mezzanine, balcony, sound screen, organ loft, fly gallery, in short, the entire theater. The initial cost of installing a stationary system is high as compared with the price range of the commercial portable vacuum cleaner, and more so as compared with the domestic portable vacuum cleaner. Yet it must not be overlooked that the incredible low maintenance of this system invariably offsets the high initial investment, for it is a fact that in a great many theaters after thirty years of service the stationary systems are still in good working order.

The low maintenance cost of this system is attributed to the fact that the vacuum producer is equipped with either a squirrel-cage or direct-current motor using electricity from the power service and not from the light system. This is an advantage because the motor in this case operates at 3500 or 1750 revolutions per minute, which is considered a slow operating speed and requires a minimum amount of maintenance, only requiring lubrication of the two motor bearings by the engineer every month or so. There are no wearing parts that have to be replaced, and also there are no problems such as frequently occur with any type of portable, such as having the equipment misused by the porters, parts such as wheels and castings broken through carelessness in handling, or the lack of maintenance of the motor which is overlooked and eventually results in expensive repairs and putting the portable cleaner out of service, usually when badly needed.

The stationary system also is the most sanitary means of cleaning because as the dirt and litter are sucked up by the cleaning nozzle from the carpets they are carried through the hose, through the piping, and eventually deposited in the dirt separator in the boiler room. The foul air, after passing through the vacuum producer, is discharged into the boiler flue, leaving the theater "clean-smelling."

The commercial portable vacuum cleaner, also known as the tank-type, primarily is designed for continuous heavy-duty service, embodying to a lesser degree some of the advantages of the stationary system mentioned before in connection with suction and dirt capacity, and the compactness and portability of the domestic type.

Many different makes of commercial portable vacuum cleaners are

available varying in cost and efficiency, each make being of a different type of construction and general design, using different types of motors, size of dirt receptacles, and filter bags, all designed to operate on the lighting circuit, which is usually 110 volts, single-phase, and therefore, usually equipped with a Universal-type motor, from $^1/_3$ to $1^1/_2$ horsepower. It is important to remember that the speed of these motors will vary from 7000 revolutions per minute to a high 12,000 revolutions per minute, and the higher the speed of the motor the greater the wear of the motor brushes and wearing down of the commutator, with, unless given very frequent maintenance, the eventual burning out of the motor, and the machine out of service. That is what we mean by high maintenance. With the commercial cleaner, it is important that it have a liberal dirt pan and filter bag of ample size, and have efficient suction at all times, in order to permit the continual operation by the porter to do a good cleaning job without having to stop and shake the filter bag and empty the dirt receptacle too frequently.

The domestic type of vacuum cleaning has been of great value to the housewife the world over, but when considered for use in a theater it should be remembered that this type has been designed primarily for limited duty. There are innumerable makes available, both in the upright and tank types.

The disadvantage of either of these types is the fact that they have extremely high-speed operating motors varying from 13,000 revolutions per minute to 16,000 revolutions per minute, and therefore the cost of repairs, replacement of motor bearings, switches, cords, and general servicing is frequent and high, and their efficiency is very low due to their small dirt capacity and low suction.

It has been proved by laboratory tests that, to do the best job, the proper suction at the carpet nozzle for removing dust and grit is 39-inch water lift, sometimes referred to by its equivalent, 3-inch mercury lift, or $1^1/_2$-pound lift, and the cleaner that comes nearest to this requirement is the right machine for the theater.

In conclusion, the stationary system in all cases, no matter by whom manufactured, gives the desired results just outlined, and makes possible the thorough and most sanitary means of cleaning the theater. The commercial portable vacuum cleaner will vary considerably depending on the make selected. This domestic portable vacuum cleaner has an extremely limited place in theater cleaning. Its only advantage is the low initial cost but this definitely is offset by its limited efficiency and high maintenance cost.