whittaker

Whittaker Smart Care® Interim Carpet Cleaning Systems

Time and Motion Study
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aics American Institute for Cleaning Sciences®

This AICS time study was approved by R.E. Whittaker Company

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1. Introduction

The American Institute for Cleaning Sciences (AICS) is pleased to submit this report detailing the results of a time-and-motion study using the Whittaker Smart Care® Cleaning System. The study was conducted with permission at the Atria Senior Living located in Lakewood, Colorado. Atria Senior Living is one of the leading senior living providers in North America and Canada with over 180 locations. Their buildings have the highest quality standards for cleanliness and interior finishes, and their staff is dedicated to occupant care. Atria Senior Living's cleaning operations is third-party certified, meeting the stringent criteria of the ISSA Cleaning Industry Management Standards Green Building (CIMS-GB). CIMS-GB certification is a quality management standard that stresses the benefits of implementing quality principles that focus on customer satisfaction and desired level of excellence.

The American Institute for Cleaning Sciences (AICS) is the cleaning industry's preeminent consulting firm in the commercial cleaning industry serving property managers, building service contractors, in-house service providers, manufacturers and distributors. AICS is the architect of the comprehensive Cleaning Industry Management Standard Green Building (CIMS-GB) and acts as the registrar for the ISSA certification program.

AICS is focused exclusively on the commercial cleaning industry. Our involvement with hundreds of industry firms expands our expertise and knowledge to bring you the most comprehensive information and business solutions available.

2. Scope of the Study

This study focuses on interim carpet cleaning in a senior living facility in an unobstructed area (hallway). The principles of a time-and-motion study can be applied to any building type to verify the production rates of interim carpet care and other cleaning tasks.

3. Purpose

The purpose of this study is to verify the average practical production rate for interim carpet cleaning using a Whittaker 20" TRIO with triple cylindrical brushes and a 2-gallon onboard solution tank.

4. Current State of Interim Carpet Cleaning

Interim carpet cleaning is essential when assembling a commercial carpet cleaning program. The leading carpet mills and the Carpet and Rug Institute recommend interim carpet maintenance as part of a comprehensive carpet care program. The purpose of interim maintenance is to enhance the appearance of the carpet, remove abrasive or oily soil and extend the life cycle of the carpet. Interim maintenance reduces the frequency of wet extractions.

The annual frequency of interim carpet maintenance may be 2-12 times per year depending on the building traffic areas and soil conditions. It is recommended that building managers and cleaning service providers review the carpet warranty and establish cleaning frequencies that meet the requirements of the carpet mill.

5. Time-and-Motion Study Method

A time-and-motion study defines the task and work performed in each period of time. The workers should perform the work according to standard operating procedures (SOP), under average conditions, and at a pace which will produce an average production rate. All the working conditions should be carefully considered for the time-and-motion study to be practical. There are numerous variables that impact production rates. The building classification, age of the building, soil loads, carpet construction, building occupants, weather, obstructions, density, square feet of carpet, work interruptions and other factors can increase or decrease the hours needed to clean.

5.1. History of Time-and-Motion Studies

AICS uses a methodology founded on Scientific Management principles practiced by Frederick Winslow Taylor. The key element in Taylor's technology of work, to which he gave the name "scientific management," was the time-and-motion study. This was, and is, a technique for determining how fast a job can reasonably be performed, and for identifying, and eliminating, inefficient and time-wasting practices.

5.2. Practical versus Theoretical Time Studies

The cleaning industry recognizes two types of time studies conducted by manufacturers, service providers and third party-firms. AICS used practical cleaning time practices for the time-and-motion study.

(1) Theoretical Cleaning Times

Theoretical times are calculated based on the cleaning width of a machine or tool and the forward walking pace of the cleaning worker. The average walking speed of a cleaning worker may be 1-2 miles per hour (mph). This number is then multiplied by 5280 (feet in a mile) and then divided by 12 inches. The final calculation is sq. ft. per hour that the cleaning equipment or machine will yield. Theoretical numbers do not represent the numerous variables of real world production rates.

(2) Practical Cleaning Times

Practical times account for real world conditions and a consistent set of variables that can be defined by managers or supervisors in the building. These variables may include area type, soil conditions, floor surfaces, building type, travel time, setup time, equipment and worker skill levels. Many operations managers make an attempt to "guesstimate" these times. For accurate job costing and budgeting, it is considered a best practice for managers to conduct a time-and-motion study of common tasks such as restroom cleaning, vacuuming, pulling trash and floor cleaning.

6. Time-and-Motion Study Protocol

An unobstructed hall was selected for the study. The workers used the same standard operating procedures (SOP) and protocol during the time study.

6.1. Two males and one female worker were asked to participate in the study. All the workers had several years' experience in the commercial cleaning industry. The ages and physical abilities of the test subjects were diverse. The workers did not have any special needs or learning disabilities.

6.2. The substrate for the unobstructed hallway was standard dense, low-profile loop construction commercial carpet.

6.3. 1,000 sq. ft. areas were measured using a Disto 330 Laser measuring device, and then the distances were reconfirmed using a commercial walk wheel and tape measure.

6.4. The 1,000 sq. ft. area was framed using blue masking tape. Start and stop points for the workers were marked as indicators

6.5. The workers were trained on the functionality of the machine. Each worker was instructed to use systematic overlapping passes similar to the motion of a lawn mower. Each pass was overlapped 1-2".

6.6. The unobstructed area in the study was cleaned wall to wall.

6.7. The workers each took turns with the machine. Each worker cleaned the area three times.

6.8. The unobstructed areas required the workers to change 2 power outlets. It took each worker 45–60 seconds to change outlets. This time was calculated into the total cleaning time of the machine. The machine was equipped with a 50' commercial electrical cable.

6.9. Cleaning time was recorded for each worker at the end of the 1,000 sq. ft. area using a stopwatch, clipboard and time sheet.

6.10. Travel time from the closet to the work area to refill the tank was not measured as part of the practical production rate.

6.11. Cleaning times and worker cleaning techniques were videotaped.

6.12. After all data was collected, the production rates, data and videos were thoroughly reviewed by AICS.

7. Published Production Rates

Industry published rates are measured in minutes per thousand sq. ft. These times are then translated into sq. ft. per hour. The ISSA 612 Cleaning Times table below demonstrates published times for interim carpet cleaning tasks.

Table 1. ISSA 612 Published Interim Carpet Cleaning Times Example

ISSA 612 TIMES - INTERIM CARPET METHODS		Sq. Ft.	Minutes	Sq. Ft. Hr.
240	Bonnet Clean w/ Immersion Method using 17" Rotary Floor Machine	1,000	69.60	862
241	Bonnet Clean w/ Immersion Method using 20" Rotary Floor Machine	1,000	62.86	955
242	Bonnet Clean w/ Immersion Method using 21" Rotary Floor Machine	1,000	60.00	1,000
243	Bonnet Clean w/ Spray-On Method using 17" Rotary Floor Machine	1,000	54.00	1,111
244	Bonnet Clean w/ Spray-On Method using 20" Rotary Floor Machine	1,000	47.25	1,270
248	Dry Clean, Spread Dry Cleaning Compound	1,000	13.20	4,545
249	Dry Clean, Agitate Dry Compound w/ 12" Revolving Brushes Machine	1,000	34.80	1,724
250	Dry Clean, Agitate Dry Compound w/ 24" Revolving Brushes Machine	1,000	25.20	2,381
259	Dry Foam Clean using One-Pass 13" Machine w/ Simultaneous Foam Pick-Up	1,000	33.00	1,818
260	Dry Foam Clean using One-Pass 24" Machine w/ Simultaneous Foam Pick-Up	1,000	22.80	2,632
279	Scrub w/ 15" triple counter rotating application and chemical application	1,000	5.13	11,700
280	Scrub w/ 20" triple counter rotating application and chemical application	1,000	3.70	16,200
281	Scrub w/ 15" dual counter rotating brush machine (agitate only; no spraying)	1,000	07.69	7,800
282	Scrub w/ 20" dual counter rotating brush machine (agitate only; no spraying)	1,000	5.56	10,800
290	Scrub w/ 7" dual counter rotating brush machine and chemical application	1,000	45.94	1,306
291	Scrub w/ 11" dual counter rotating brush machine and chemical application	1,000	29.23	2,053
292	Scrub w/ 15" dual counter rotating brush machine and chemical application	1,000	21.44	2,799
293	Scrub w/ 30" dual counter rotating brush machine and chemical application	1,000	10.72	5,597

8. Whittaker Practical Time-and-Motion Study

The production rates of the Whittaker 20" TRIO are an average of the workers' practical cleaning times obtained as a result of a practical time and motion study. Users may experience site-specific variables that can increase or decrease the production rates and annual labor cost. The time-and-motion test protocol can be replicated using similar machines to establish a practical production rate in schools, universities, manufacturing, healthcare or any building type.

Table 2. AICS Time-and-Motion Study Findings

WHITTAKER 20" TRIO - SMARTCARE INTERIM CARPET METHOD	Sq. Ft.	Minutes	Sq. Ft. Hr.
Scrub w/ 20" triple counter rotating brush machine and onboard chemical application	1,000	4.96	12,352

9. Observations

AICS observations are as follows:

(a) The cleaning workers in the time study increased their production rates as they became more familiar with the area they were cleaning. Once the power outlet was identified, the time to clean a 1,000 sq. ft. area decreased.

(b) The workers in the study preferred the triple cylindrical brush design. The machine was self-propelled which allowed the worker fingertip maneuverability. Ergonomic machine design can reduce worker fatigue, repetitive motion injuries and vibration to the operator.

(c) Power cord management, outlet discovery and untangling the cord can consume additional time and worker effort. The average time to stop and change an outlet was 45-60 seconds in a 1,000 sq. ft. area. Had the test area been 20' by 50', the elimination of cord management could yield close to 14,250 sq. ft./ hour.

(d) The Whittaker TRIO is equipped with a 2-gallon solution tank and onboard sprayer. This eliminated a two-step procedure. The time to fill the 2-gallon tank was 1.5 – 2 minutes. The ISSA 612 published time to use a hand pump up sprayer is 10 minutes per 1,000 sq. ft. An electric sprayer is 5 minutes per 1,000 sq. ft.

(e) The Whittaker TRIO encapsulation technique had a dry time of 20-30 minutes on commercial loop pile carpet. Wet extraction can take 4-8 hours to dry, depending on the variables of the facility.

(f) The 2-gallon chemical tank coverage was 4,000 sq. ft. or a half gallon per 1,000 sq. ft. for moderate soil conditions. Additional chemical may be necessary for high-traffic areas with heavy soil conditions.

(g) The Whittaker TRIO machine's three cylindrical brushes acted as a pile lifter, eliminating the need to operate a separate pile lifter machine during wet extractions.

(h) The layout of the test area was three separate hallways with two 90-degree turns connecting them. It is possible that cleaning one straight hallway might yield a slightly higher production rate.

10. Conclusions

Practical production rates for interim carpet cleaning are essential to determine accurate staffing levels and job costing in all types of commercial buildings.

Standard operating procedures, worker training, best practices and utilizing specialists may generate additional efficiencies beyond a practical production rate. The elimination of non-productive time and designing intuitive cleaning systems will assist in-house service providers and building service contractors to increase labor efficiencies and to reduce hours or dollars from the bottom line.