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CASE STUDY: Golf Course Golf Club Cleaner

Introduction

While golf ball cleaners are common on golf courses, golf club cleaners are less common. This is because they are either too ineffective or else too expensive. There is a need for a golf club cleaner which is easy to use and which is both effective and affordable, to be placed besides the existing ball cleaners on golf courses. There is a market for approximately 95,000 [1] cleaners in the U.S. alone.

Available Club Cleaners

The club cleaners currently available are either ineffective or too expensive to be used for most golf courses. The simplest and least expensive club cleaning method can be achieved using a toothbrush and a bucket of soap. This option may well be inexpensive and reasonably effective, but the amount of time and level of maintenance required, if it were to be placed along a course, make this option impractical for use.




Several designs exist that require the user to force the club between bristles and rub the club face on the bristles until clean. This option is relatively cheap, but is not effective because of the difficulty of properly cleaning the club. The method can also become time consuming to achieve an acceptable level of cleanliness.

A similar but more expensive and improved method incorporates a spring to assist in pressing the club face against the bristles. The additional costs of this method reflect in improved effectiveness, however, not enough to make this option an appropriate solution. The highest-end club cleaners use ultrasonic technology to clean the club and are highly effective but very expensive. The high cost of these cleaners renders them inappropriate for use along a golf course.

The following are club cleaning solutions that are available on the market **today**:

<i>Image</i>	<i>Description</i>
	<p>This first solution is the cheapest alternative because its parts can be found around the home. It simply consists of a bucket of soapy water and a toothbrush. The user dips or soaks the club faces in the soapy water and then scrubs the club face with the toothbrush.</p> <p><i>Image:</i> golf.about.com</p>
	<p>The second solution is called the "Club Tub" and it costs approximately \$40 [2]. This device has two linear brushes and is enclosed by a tub of soapy water. The user holds the device in place with one foot as seen in the picture and then pushes the club face in and out of the space between the bristles until the club face is clean</p> <p><i>Image:</i> brookstone.com</p>

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	<p>The third solution is a combined club and ball cleaner that attaches to a golf cart. It has an approximate cost of \$50 [3]. The club cleaner portion of this unit uses the same concept as the “Club Tub” with two linear brushes. However, it exists on a smaller scale. <i>Image:</i> mygolfproshop.com</p>
	<p>The fourth solution is the elegant club cleaning solution for golf courses. This cleaner is using the two linear brushes like the “Club Tub” but has added a springing mechanism to produce a constant force on the club during cleaning. This club cleaner costs approximately \$225 [4]. <i>Image:</i> kirbybuilt.com</p>
	<p>The final solution is the most extravagant. It costs at least \$8000 [5]. It uses ultrasonic technology to clean the club face and grip. There are different settings for different clubs and materials. <i>Image:</i> maveneat.com</p>

The goal of this design project is to design a golf club cleaner that can be used at golf courses across the world. Several constraints had to be identified to ensure the club cleaner was properly designed. To ensure the club face is properly cleaned, water is assumed to be required to loosen the bonds between the dirt particles and the club face.

The cleaning process should take less than 5 seconds, based upon a similar amount of time required to use a ball washer. It is also necessary that all mud and dirt is removed from the club face without any damage being done to any part of the club. To take full advantage of the market, it is required that the club cleaner accommodates both left-handed-and right-handed golf clubs.

References (you are **not** allowed to access these references during the exam!)

1. “Golf Courses in the United States”, <http://www.thegolfcourses.net/>
2. “Clubtub”, www.amazon.com/Denali-Clubtub-Portable-Club-Cleaner/product-reviews/B000HXLJWI
3. “My Golf Pro Shop Accessories” www.mygolfproshop.com/golf-accessories_club_clean.htm
4. “Club Washer” , <http://www.kirbybuilt.com/golf-17-square-club-washer>
5. “Ultrasonic Golf Club Cleaner” <http://www.sharpertek.com/ulgoicl.html>
6. “Golf Club Cleaner”, Terrier, Tiffany, ME 481 Final Report, Department of Mechanical Engineering, University of Waterloo, Waterloo, ON, Canada, July 28, 2010.