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# Experiment of Bowling Lane Oil Removal

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# Introduction

- In the bowling ball industry, we have been looking for a solution to extract oil coming from the lane effectively and thoroughly.
- There are several ways to remove the oil from the ball, and the most convenient way is to use bowling ball cleaner after every game, to treat the surface of the ball. The most of the solution may remove the oil but the removal is usually only limited to the surface of the ball.
- The extended use of the ball, especially after 30 games or more, induces deeper penetration of the oil into the ball which is porous in nature.
- Once the oil penetrated deep into the ball, the conventional method of extracting the penetrated oil is heat treatment : 1). Oven, 2). Hot Water Bath, and 3). Steam Wash and Ultrasonic with Surfactants. Those methods require well-controlled temperature to avoid temperature gradient between the core and the surface of the ball. Higher temperature gradient will eventually damage the integrity of the ball. In order to achieve the maximum extraction, the machine has to designed and built specifically for this purpose..
- However, these machines are not easy to have for the personal use... even for a small pro-shops... Given these, we started to look for the best solution which can solely remove oil without a special machine, i.e., ideally no heat.

# Experiment

Date & Time: November 7 - November 14, 2014.

Experimenter: FEMTECH Co., Ltd.

## Method:

1. Crush a new out of box ball cover stocks into enough amount of small pieces.
2. Make 20 of around 10g groups in a small cups... hereafter call: Test Blocks
3. Measure the weight of Test Blocks by the scale which can be measured up to 1/100 mg and record them respectively.
4. Put all of them into lane oil tubs
5. About 60 hours later, take them out and left for 12 hours to dry them in a room temperature.
6. Measure the weight of each Test Block and record them.
7. 5 oiled Test Blocks are separated into 4 groups.



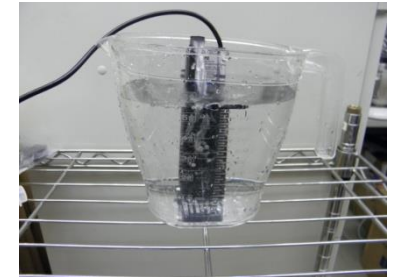
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# Experiment

## Method (continued):

8. Prepare 4 types of oil removal tubs with small aquarium pumps to wash according to the solutions tested...

- For Group 1: Water
- For Group 2: Ion Power S
- For Group 3: Ion Power 2000
- For Group 4: Existing Oil Remover



9. Put one Test Block from each group into the oil removal tubs for 60min.

10. Take out Test Blocks and left for about 90 hours to dry them in a room temperature.

11. Measure the weight of each Test Block and record them.

12. Repeat step 8 to 11 to complete 5 test cycles to get the averages of each group.

# Results and Considerations

## Results:

	A: Before Oil Adhesion (g)	B: After Oil Adhesion (g)	C: After Oil Removal (g)	Effectiveness (B-C)/(B-A)=(%)
Water	10.50	10.80	10.63	56.7
<b>Ion Power S</b>	<b>10.59</b>	<b>10.91</b>	<b>10.67</b>	<b>75.0</b>
<b>Ion Power 2000</b>	<b>10.55</b>	<b>10.81</b>	<b>10.60</b>	<b>80.8</b>
Existing Oil Remover	10.58	10.86	10.69	60.1

## Considerations:

- All existing Oil Removal Solutions can be concluded to be effective....
- Ion Power 2000 is the best and Ion Power S is the next.
- In the case of water, we can see the oils on the surface of the water while washing, however, it might be just came from the surface of Test Blocks and not from the inside (pores) of the cover stocks.
- Since water it self will be kept some in the pores of the cover stocks, it was better to leave it longer before we measure the results..
- The room temperature was between 13 to 22 degree C, we should use a chamber to have more accurate results.
- If we do this like in 30 degree C and 40 degree C, the results will be more interesting..