CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2005
DateRun:	06/24/2005
Experimenters:	Jason Marshall
ClientType:	Environmental Service Firm
ProjectNumber:	Project #1
Substrates:	Wood
PartType:	Coupon
Contaminants:	Coatings
Cleaning Methods:	
Analytical Methods:	Performance Test
Purpose:	To determine the coefficient of friction for additional floor finishes.

Experimental Procedure:

Control of Moisture Content and Temperature
The moisture content at the time of testing will influence results due to the hydroscopic nature of the base materials. Therefore, efforts must be taken to ensure that the moisture content and temperature remain constant during the evaluation period. Ideally, the sample floor should be kept at 65+/-1% relative humidity and 68+/-6 F.

During laboratory testing, conditions were slightly drier, 40% relative humidity, but the temperature was within the given temperature range ~70 F).

Sample Preparation
The flooring material supplied was Hardwood flooring made from Red Oak. The boards were ¾" thick, 2 ¼" wide and cut into 8" sections. Some pieces of the flooring had to be sanded prior to making initial thickness readings to remove residual packing tape adhesive. With the boards cut into 8" coupons, three readings were made using a Brown & Sharpe Micrometer to measure each coupons initial board thickness. Each reading was made to 0.001" and the three values were averaged to give a baseline thickness for the coupons. In addition to the thickness baseline, baselines were established for Gloss, Coefficient of Friction, Impact, Small Area Loads. Procedures for each baseline measurements followed the procedures to be outlined.

Following the establishment of the baselines, three coupons were coated with a supplied floor finish according to the manufacturers' specifications. The finish was applied using a 1" Pure Bristle 1500 paint brush. To ensure consistent coating application, the finish was leveled off using a 10 mils Precision Gage & Tool Co Dow Film Caster. Three coats were used for each floor finish as this was common number of coating layers suggested by the various manufacturers. Each coating layer was allowed to dry for 2 hours prior to the application of the next coat. Completed coupons were allowed to sit for a minimum period of 24 hours before performance evaluations were conducted.

Coefficient of Friction
The ASTM specified apparatus was replaced with an IMASS, Inc SP-102B-3M90 Slip/Peel Tester (Figure 1). Two types of friction coefficients were measured using this instrument. The first, Static CoF, was determined by obtaining the force required to move the specimen from a stationary position. The second, Sliding CoF (or Kinetic), was found by measuring the average force required to maintain movement at a certain rate. Measured forces will have peaks and valleys in the amount of force needed to keep moving. Average these values results and dividing by the weight of the object will result in the desired coefficient.

Figure 1. IMASS Slip/Peel Tester

The Slip/Peel tester was first adjusted to ensure that the device was properly calibrated for the sled weight being used. A coupon was then placed and clamped onto the bed of the device. The speed of the bed was set to 45"/min. The instrument records two values, the peak, the valley and calculates the average. The device was run three times per coupon for measuring the Static CoF and three times to measure the Kinetic CoF. Each coupon's value was averaged and then the values for each finish (three coupon averages) were averaged to get one value for the Static Coefficient of Friction and one value for the Kinetic Coefficient of Friction. These values for coated samples were compared to the CoF for the same uncoated coupons.

Coefficient of Friction = Ratio of tractive (pulling) force to the normal force (sled weight): CoF = F/N = (Tractive force)/(Normal Force) = (meter reading)/(sled weight)

Results:

Product ID Products Tested:
1 Hydro 202 Satin
6 SafeCoat Satin
7 SafeCoat Gloss

Uncoated			Static			Kinetic	
	Coupon #	Peak	Valley	Average	Peak	Valley	Average

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Capitol Hydro 202 Satin	49	706	515	524	561	502	516
		656	496	502	524	456	487
		721	493	498	533	476	485
	50	781	499	532	535	489	512
		681	498	519	531	485	512
		688	497	515	525	491	506
	51	715	532	533	551	536	542
		745	515	524	551	529	540
		775	517	522	555	537	536
SafeCoat BP Satin	2	838	607	648	645	580	609
		734	586	629	642	587	622
		759	588	627	654	577	612
	3	833	612	619	627	590	597
		798	578	593	594	578	584
		813	577	590	600	568	583
	4	729	536	553	577	525	533
		697	506	530	558	513	525
		748	530	538	564	516	529
SafeCoat BP Gloss	11	777	538	624	647	538	614
		769	528	613	642	545	616
		807	542	610	639	541	614
	12	869	619	647	636	587	610
		880	605	626	636	574	604
		864	581	623	636	574	604
	13	771	548	566	563	526	537
		698	551	562	551	520	528
		744	536	561	554	521	538

Summary

Averages	Static			Kinetic		
	Peak	Valley	Average	Peak	Valley	Average
1	694	501	508	539	478	496
	717	498	522	530	488	510
	745	521	526	552	534	539
	719	507	519	541	500	515
6	777	594	635	647	581	614
	815	589	601	607	579	588
	482	345	356	374	343	351
	691	509	530	543	501	518
7	784	536	616	643	541	615
	871	602	632	636	578	606
	481	362	374	368	347	355
	712	500	541	549	489	525

Coated Results

Coated		Static			Kinetic		
	Coupon #	Peak	Valley	Average	Peak	Valley	Average
Capitol Hydro 202 Satin	49	859	636	677	807	664	723
		891	667	694	821	678	728
		833	695	710	794	669	729
	50	1485	1024	1169	1228	986	1097
		1261	1001	1126	1172	979	1084

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		1212	969	1097	1178	956	1079
	51	1021	765	877	996	869	947
		1000	895	934	1100	928	1019
		1037	891	965	1062	916	1000

SafeCoat BP Satin	2	829	603	628	646	571	589
		750	502	621	804	582	607
		813	434	620	658	572	599
	3	827	578	620	624	557	593
		858	577	604	613	565	593
		935	574	601	618	587	590
	4	936	571	613	625	550	581
		885	554	589	657	544	574
		812	547	584	664	545	571
SafeCoat BP Gloss	11	1036	605	749	940	619	759
		834	708	735	855	604	761
		1046	728	761	975	736	761
	12	988	569	783	1067	631	800
		1184	553	789	1065	657	797
		1227	564	789	1047	779	801
	13	920	577	714	977	582	730
		1031	634	720	995	613	740
		892	493	735	743	698	720

Summary

Averages		Static			Kinetic		
	Peak	Valley	Average	Peak	Valley	Average	
1	861	666	694	807	670	727	
	1319	998	1131	1193	974	1087	
	1019	850	925	1053	904	989	
	1067	838	917	1018	849	934	

6	797	513	623	703	575	598
	873	576	608	618	570	592
	878	557	595	649	546	575
	849	549	609	657	564	589

7	972	680	748	923	653	760
	1133	562	787	1060	689	799
	948	568	723	905	631	730
	1018	603	753	963	658	763

Summary:

Conclusion: Both SafeCoat BP Gloss and Capitol Hydro 202 Satin had substantial increases to the static and Kinetic CoFs. These increase were similar to the increase for the Pro Finisher Water Based Polyurethane from the previous trial.