Chaps Testing with SCN 60-22 Chain Saw **Plano, April 4, 2025**

To Whom It May Concern,

As battery-powered cordless tools continue to shape the future of construction, questions have emerged around how traditional chainsaw leg protection performs in conjunction with this cordless technology. In response to growing customer interest and our ongoing commitment to innovation and safety leadership, Hilti commissioned independent testing to evaluate how two ASTM F1897-certified chaps perform with the Hilti SCN 60-22 battery-powered chainsaw.

The enclosed report—prepared by Modern Headwear Ltd., Pro Safety Division—presents the findings from simulated cut-resistance testing conducted on the following chap models:

- Clogger Arcmax (Model #: CU91FCR)
- Delta Plus ProChaps (Model #: JE-90233)

Both products are certified to ASTM F1897 prior to this testing. That standard references ASTM F1414 the cut-resistant test method, which traditionally involves gas-powered saws. To explore performance in the context of our battery-powered tools, Hilti engaged Modern Headwear to conduct a series of informational, non-certifying tests using a simulated ASTM F1414 setup with the Hilti SCN 60-22 (Model #: 2401719).

While this testing does not constitute certification or modification of any existing standard, it offers valuable insights for safety professionals evaluating PPE performance with Hilti's SCN 60-22.

Highlights from the Testing:

- Both chap models demonstrated zero cut-through in all scenarios.
- Internal layers were displaced as expected, indicating energy absorption and engagement of protective mechanisms.
- The complete methodology, calibration, and speed verification are detailed in the attached report.

We also note that the Hilti SCN 60-22 is certified to UL/CSA/IEC 62841-4-1, showing compliance with recognized global safety standards for handheld battery-powered chainsaws.

This testing supports Hilti's internal safety policy recommending the Clogger Arcmax as the standard PPE for Hilti field personnel operating the SCN 60-22. While these results provide useful insight under controlled conditions, they do **not replace** formal certification processes or field-specific safety evaluations. Users should continue to follow manufacturer instructions, applicable safety standards, and best practices during operation.

By sharing this report, Hilti aims to provide customers with **informational data** to support PPE selection as battery-powered tools become more common on the jobsite. We remain committed to advancing safety through transparency, innovation, and practical solutions.

For more details or to discuss how Hilti can support your team's safety goals, please contact your local Hilti representative.

Sincerely,

Khadija Talley

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Modern Headwear Ltd. – Pro-Safety Division

Report on Cut Testing done for Hilti Corp Battery Chainsaw

Scope of Study:

The tests were performed using the Hilti Battery Chainsaw provided Modern Headwear on Proforma Invoice PF250446 {Hilti Corporation} document received with package at Modern Headwear Winnipeg Manitoba.

Total Provided Items was :

A/ one Chainsaw – Power Head w/Bar and Chain attached.

B/ one extra 16" bar 3/8 " pitich

C/ four 16" Oregon Chainsaw Chains 3/8 pitch R56

D/ one Delta Plus Aprons – PPE

E/ one Clogger Chap -PPE

Modern Headwear Mounted the Power Head /Chainsaw provided on a Swivel table as shown below:

Weight and measures for this modified lab equipment were based on ASTM F1414 Test Methods for cut resistance testing of Chainsaw Leg Protective Devices *{ Note this ASTM F1414 Reference was only the guide used to mount the Hilti Battery Saw and this lab set up is not considered as an actual ASTM F 1414 testing device , this set up is only to simulate the parameters as close as possible to gather data specific to the power head shown above}*

Modern Headwear Ltd. – Pro-Safety Division

Report on Cut Testing done for Hilti Corp Battery Chainsaw

Scope of Study: Continued

All weight and measures were checked with assembled testing stand and determined to be :

1/ 15 Newton's force down on Cut Specimens.

2/ 2" Space from Bottom of Saw Chain /Bar Guide to the top of Specimen Pad

3/ Scale factor Calculation of 0.375 feet – which is the length one tooth travels on one rotation of the power head sprocket drive : {as provided with the saw}

Eg. 2750 Feet Per Minute as in ASTM F1897 Chainsaw leg Protective devices Performance Requirements equals to 7333 RPM* actual Rotations per minute on the power head. This was the calculated target speed for each test made using the Hilti power head provided based on the scale factor above.

4/ Chain Sharpness Calibration tests were done prior to any performance tests. The parameters of an accepted result of a calibrated chain {**explained below} is 3 layer calculated average cut depth in the *Calibration pad made with Lincoln Fabrics= Model#* /ID# 1060.071.02.000 *-6 Layer construction {which is the ASTM F1414 required calibration pad type Note- the material stated is 6 layers but each single layer is a double ply heat set to create the single layer construction; so to be considered as one layer cut in a test you must penetrate the double ply of the single layer}*

**The calibration test is consisting of 2 cut strikes on one of the above described Calibration pads; so using four pads in total for the one confirmation series for a single chain to measure sharpness value –this making 8 cuts in total providing a averaged minimum calculated cut depth of 3 layer average is needed to be accepted as a chain that is sharp enough to do performance testing. {This will be shown on the chain calibration sheets that you will be provided with on the details of our report}

5 / The reading of the speeds during the cut test were made with a Laser Non-Contact Hand Held Rotations per Minute Reading Device from the Side of the Chain Sprocket Drive.

Modern Headwear Ltd. – Pro-Safety Division

Report on Cut Testing done for Hilti Corp Battery Chainsaw

Scope of Study: Continued

6/ The battery on the saw itself was charged to full on each of the calibration series of tests and also with each of the performance tests done on each chap/apron.

7/ All Specimens were mounted as to drape over the foam and leg simulated wooden cylinder and to be clamped down to hold the position underneath the moving saw chain and bar. *See Picture of Test Stand on page 1. *

8/ Saw was run to a speed of 2750 Feet per Minute {read by the laser tachometer as close as possible to the target speed} and dropped onto the calibration pads. {As explained in point 4/}

9/ Each Chap/Apron was test cut at the same speed {as point 8/ mentions} on both legs {Left //Right} with the sharpness tested and confirmed calibrated Chain. {Units tested were Clogger Chap and Delta Apron provided}.

Chain Calibration Observations:

1/ Two Chains were calibrated to meet criterion of an averaged 3 layers across each series of sharpness confirmation cut tests and these two chains were then used in the performance testing of the chaps/aprons provided.

Performance Tests Observations:

None of the test performance specimens {Chaps/Aprons- Delta Apron *Clogger Chap} had a cut through but we did notice on the Delta Apron the 5 layers of the internal protective cloth in the pad of the apron had the full 5 layers displaced by the cutting action of the saw chain on one test please note the lining was not touched or cut into by the operating saw chain. Also on the Clogger Chap we found an issue; *Note* it is usually required by UL to have a SAFETY WARNING DISCLAIMER TAG, we did not see any label like that on the garment itself**.

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Report on Cut Testing done for Hilti Corp Battery Chainsaw

Performance Tests Observations: : Continued

Safety Warning Labels Should Read similar to this:

About Modern Headwear Ltd: {Independent Laboratory Test Provider}:

Modern Headwear has been in the Chainsaw Protective Clothing industry for over 25 years. Darko Gorenc the Manager for the Pro-Safety Division has been an active member of ASTM International representing Modern Headwear and currently Chairing the ASTM TASK GROUP FOR CHAINSAW PROTECTION F23. Our independent lab at Modern Headwear has headed and participated in round robin lab cut testing within the ASTM committee on many occasions.

*This informational study done in this document was based on simulating the ASTM F1414 parameters of the Test Methodology using the provided Hilti Battery Powered Chainsaw. *Disclaimer* This independent test study must not be considered as a certification or verification of the saw or any of the performance pads used in this study. The Hilti Battery Saw provided being a battery powered chainsaw was used to simulate ASTM F1414 as mentioned above. These tests were done with the prior discussions with the Hilti Corporation that Modern Headwear Ltd in providing this study and the data gathered is **not** an engineering company that has certified {P.Eng} Engineers to officially verify the data collected. These studies have been done for information purposes only. {If More data is required Modern Headwear can quote on a more extensive study that includes Engineering Services}. This case study with the above statement understood should be used in whole as all parameters and points stated are related and need to be seen as a complete document. Also as in all Chainsaw Protective Devices such as Chaps/Aprons the Safety Warning disclaimer as shown above is the primary understanding required by end users of Chainsaw Leg Protective device. Proper use of any chainsaw petrol or battery powered may cause injury if the operator does not handle the equipment properly.*

****See next Sheets for Data Collected.**

Data Summary :

Chain # 1 - 3/8 Pitch Oregon R56 Calibrated *used on Delta Apron*

The Chain Calibration averaged – was 3 layers Cut Depth when we did our checks for chain sharpness and was accepted as a properly sharp chain for moving onto the performance testing.

We then counted the Delta Apron internal protection layers – having 5 internal protective layers.

TEST # 1 Performance test done on the Left Leg of the Delta Apron had 5 of 5 protection layers displaced. The last actual garment layer being the lining against the leg of the garment was not cut or damaged by the moving saw chain. Left Leg cut test speed was 2751.75 Feet per min.

TEST # 2 The Performance test done on the RIGHT Leg of the Delta Apron had 4 of 5 protection layers displaced. Right Leg cut test speed was 2751.00 Feet per min.

Chain #2 - 3/8 Pitch Oregon R56 Calibrated *used on Clogger Chap *

The Chain Calibration averaged – was 3 layers Cut Depth and was accepted as a properly sharp chain for moving onto the performance testing.

We counted the CLOGGER CHAP – having 3 internal protective layers. – We noted that the Clogger Chap seemed to have a knitted /woven 2 Ply Construction on each single layer of cloth in the inner protective pad components.

TEST # 1 The Performance test done on the Left Leg of the Clogger Chap had 2 of 3 protection layers displaced. Left Leg was cut tested @ 2750.63 Feet per min.

TEST # 2 The Performance test done on the RIGHT Leg of the Clogger Apron had 1 of 3 protection layers displaced. Right Leg was cut tested @ 2751.75 Feet per min.