

# Universal Cable Jacket Removal Tool

## Patent #9,230,717

---

GROW • IMPROVE • LEARN • NETWORK



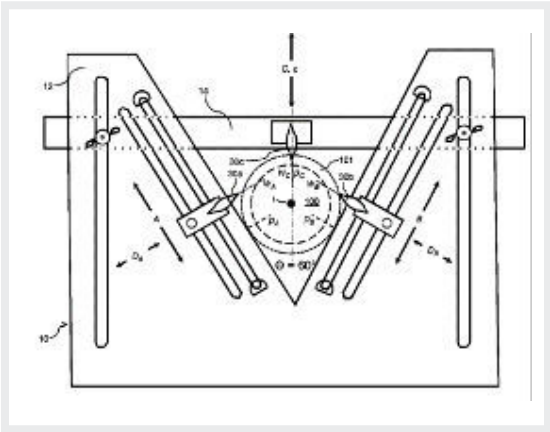
Helping Manufacturers Grow Profitably Since 1988



# Technology Overview

## Universal Cable Jacket Removal Tool – Patent # 9,230,717

The goal of the Universal Cable Jacket Removal Tool is to provide an improved methodology for removing the jacket from an electrical power cable. The present invention's cable-cutting device represents a fast, precise, and easily operated tool for removal of thick jacket material from cabling (e.g., naval shipboard cabling or utility power system cabling) across a broad range of cable diameters and jacket thicknesses. As distinguished from conventional devices, the device provides mechanical advantage to reduce the forces required to complete the task. The device cuts linearly, as opposed to the spiral cutting of conventional devices.



## Capabilities

- The device anchors to the cable via a Kellum grip having a yoke ring end. On the other end of the device is a second yoke ring, including a tension cable-ratcheting take-up mechanism.
- The device cuts linearly, as opposed to the spiral cutting of conventional devices.

## Benefits

- The device provides mechanical advantages to reduce the forces required to complete the task.
- The present invention features adjustability of its cutting blades.
- The invention also affords a faster, easier cutting action than conventional hand tools.

## Benchmarks

Benchmarks are unique qualities that are used to compare against existing patents, patent filings, and commercially available products in this assessment tool.

Index Number	Title	Description
1	Mechanical Advantages	The Universal Cable Jacket Removal Tool eliminates the need for the practitioner to provide both the holding force and the cutting force. The present invention's combination of a tensioning yoke assembly and wire-tension pulleys reduces the force required to perform the cutting action.
2	Adjustability	Each form of adjustability includes positional locking. By virtue of its multi-directional, multi-bladed adjustment capabilities, the present invention can accommodate practically any cable diameter and jacket type while affording accurate and reliable cutting results.

# Market Research

## Executive Summary

This section provides insights into market size, trends, and barriers to entry for the commercial applications of the technology, as well as recommendations for deeper market research. Potential markets include Aerospace and Defense, Power Generation, Telecommunications, and Subsea Production And Processing. The fastest growing market is the global Power Generation market with a Compound Annual Growth Rate (CAGR) of 8.04%. A few of these markets are highly consolidated and have high barriers to entry, but this invention could prove useful in these markets and break through.

Potential Markets	Market Insights
<b>Aerospace</b> Relates to all aircraft used for commercial and defense production globally.	<b>Market Size</b> <ul style="list-style-type: none"><li>The global Aerospace Parts Manufacturing market size was estimated at \$899.5 billion in 2022 and is expected to grow at a CAGR of 4% from 2023 to 2030.</li></ul> <b>Market Trends</b> <ul style="list-style-type: none"><li>The market is growing as a result of growing passenger traffic, especially in Asia Pacific and the Middle East and Africa; this is expected to drive the demand for and production of aerospace parts.</li><li>The increasing demand for lightweight and fuel-efficient aircraft (to reduce greenhouse gas emissions) is positively influencing the demand for aerospace parts manufacturing.</li><li>The global expansion in air passenger and air freight volumes--against the backdrop of economic growth in emerging countries and considerable developments in commercial aerospace--are predicted to be key market drivers.</li></ul> <b>Barriers to Entry – High</b> <ul style="list-style-type: none"><li>The market is dominated by large, established players.</li></ul> <b>Key Players</b> <ul style="list-style-type: none"><li>JAMCO Corporation, Intrex Aerospace, Rolls Royce plc, CAMAR Aircraft Parts Company, Safran Group</li></ul>

# Market Research (cont.)

## Potential Markets

## Market Insights

### Power Generation

All forms of energy consumption related to generating electricity

#### Market Size

- The global Power Generation market was estimated at \$1,800 billion in 2022 and is expected to reach \$3,900 billion by 2032, (a CAGR of 8.04% during the forecast period from 2023 to 2032).

#### Market Trends

- The demand for electricity is expected to increase along with household incomes, driven by an increased rate of electrification of transportation, heat, and surging demand for digitally connected devices and air conditioners.
- The Power Generation market has experienced great demand due to various factors, such as increasing population, and rapid urbanization.
- Economic growth is only possible as infrastructure (e.g., power) grows.

#### Barriers to Entry – High

- Existing generation equipment and systems rely on aging infrastructure, which struggles to meet the growing demand for electricity.
- Declining investment in power sectors is the biggest challenge to market growth.

#### Key Players

- Enel SpA, Electricite De France SA, State Power Investment Corporation, E.ON SE, Engie

### Telecommunication Services

Includes mobile data services, fixed internet access services, mobile- and fixed voice services, pay TV services, and mobile messaging.

#### Market Size:

- The global Telecommunication Services market was valued at \$1,602 billion in 2021 and is projected to reach \$2,556 billion by 2031 (a CAGR of 5.1% from 2022 to 2031).

#### Market Trends

- Increased mobile data traffic, fiber deployment required for connectivity, and 5G networks are boosting market growth.
- Emergence of the Internet of Things (IoT) is expected to offer significant expansion opportunities during the forecast period.

#### Barriers to Entry – High

- Government network radiation regulations hamper Telecommunication Services market growth.

#### Key Players

- Alcatel Lucent Enterprise, AT&T Inc., Bharti Airtel Limited, Cisco Systems Inc., China Mobile Limited

# Market Research (cont.)

## Potential Markets

### **Subsea Production And Processing**

Subsea Processing entails harsh environments where processing equipment on the water's surface may be jeopardized.

## Market Insights

### **Market Size**

- The Subsea Production And Processing System market is expected to reach \$17.45 billion in 2023 and is anticipated to register a CAGR of over 8% during the forecast period from 2019 -2028.

### **Market Trends**

- Increasing oil & gas discoveries, and the global liberalization of the industry are creating new investment opportunities.
- Deepwater and ultra-deepwater will dominate the Global Subsea Production and Processing System market, owing to increasing deepwater exploration and production activities.
- Rising investments in offshore oil & gas activities--resulting from surging energy demand, depleting onshore reserves, and government efforts to explore their offshore resources--are expected to drive Subsea Production and Processing System market growth in the coming years.

### **Barriers to Entry – High**

- Recent oil price volatility--driven by the supply-demand gap, geopolitics, and several other factors—is restraining growth in the demand for Subsea Production and Processing Systems.
- The market is highly consolidated, with fewer than five companies dominating production.

### **Key Players**

- Schlumberger Limited, Halliburton Company, Baker Hughes Company, Aker Solutions Asa, Oceaneering International Inc

# Market Research (cont.)

## Conclusions

- The Aerospace market is attractive due to the projected increase in production for both military and civilian use; large wires key to production require efficient ways to cut and strip them.
- The Power Generation market is the best fit for this technology, with the increasing need to advance the global electrical infrastructure.
- The Telecommunications market is also viable--cables used to run communication lines would benefit from the cutting device.
- The Subsea Production and Processing System market could also be hold potential. The need to run cables long distances underwater will drive the need to effectively cut and strip those cables.

## Recommendations

### Priority Key:

- **Must:** A critical and time sensitive recommendation to advance technology with respect to the area of focus.
- **Should:** An important recommendation to advance technology but is dependent upon predecessor recommendations or is not time sensitive.
- **Could:** A recommendation that will have insignificant impact on advancing the technology but could be a beneficial consideration.

Recommendations	Priority	ROM Cost	ROM Timeline
Advance TRL and MRL Plan	2	\$15,000	4 months
Market Planning and Scouting	3	\$35,000	6 months
License technology	1	\$15,000	2 months
<b>ROM Total:</b>		<b>\$65,000</b>	

## Level of Market Opportunity



Analyst: DVIRC

# Competitor Analysis

## Competitor Analysis Intent

The intent of this section is to identify potential commercially available, competing technologies and provide conclusions and recommendations based on the information provided at the time of assessment. The resulting information may be used to identify technology strengths or weaknesses in features or claims, as well as potential licensing partners.

## Research Methods

Various resources to uncover information about different companies that perform similar functions

Markets	Competitors
Handheld Strippers	<p><b>Coppermine:</b></p> <ul style="list-style-type: none"><li>• <b>Handheld Copper Wire Stripping Tool Using Stock Blade:</b> Small size fits in pocket, strips from 24 AWG (3/64") to 0 AWG (7/16"), solid or stranded. Strips all types of romex; strips cords and coax.</li><li>• <b>Manual Pull Copper Wire Stripping Machine Cable Wire Stripper:</b> Original blade has three carefully sharpened cutting surfaces that combine sharpness and durability. Good for wires from 24 AWG to 250kcm, either solid or stranded. Independently adjustable blade and rollers smoothly strip wires of ANY shape (Romex, square, parallel, triangle, etc). Clamp-mount on the corner of your bench.</li><li>• <b>Beginner Manual Hand Crank Copper Wire Stripping Machine:</b> Adjustable wire clamps that prevent thin and soft wires from "escaping" the blade. Adjustable to clamp the wire with different sizes.</li></ul>
Automatic Strippers	<p><b>Coppermine:</b></p> <ul style="list-style-type: none"><li>• <b>Industrial Automatic Copper Wire Stripping Machine:</b> useful for wires from 22 awg to 1250kcm, (1/16" to 1-1/2")* either solid or stranded, ten standard channels for round wires, two dedicated Romex channels, four slitting channels for jacketed wires, three zip cord channels for zip cord, powerful 3hp motor runs off any wall outlet (110-120vac) 30a, stripping speed: 200 feet per minute, adjustable tension works with different insulation, soft or hard, double-cut mechanism gets the copper out in just one pass.</li><li>• <b>Industrial BX Cable &amp; Copper Wire Stripping Machine:</b> Useful for wires from 22 awg solid /18 awg stranded to cables 4-1/2" in diameter, power requirement: 3-phase 208VAC 60Hz 15A or (optional: single-phase 240VAC 60Hz 30A), motor: 208-240VAC, 60Hz, 5.5HP, 3-phase or (optional: 240VAC, 60Hz, 5.5hp, single-phase, weight: 780 lbs., dimensions: 50" x 20" x 53", total channels: 15, adjustable speed: lets user set the optimum speed based on wire condition, adjustable tension works with different insulation, soft or hard, double-cut mechanism gets the copper out in just one pass, stripping speed: from 60 to 300 fpm.</li></ul> <p><b>BlueDog:</b></p> <ul style="list-style-type: none"><li>• <b>BWS-80 HD Industrial wire stripping machine:</b> Strips both sides of the wire from 14 ga up to a true 3 1/8" diameter cable and is specifically designed to strip large diameter cable with really thick coatings such as power main cable or XLPE.</li></ul>

# Competitor Analysis (cont.)

## Conclusions

The Universal Cable Jacket Removal Tool has commercial potential if it can be shown to outperform the competitors currently in the market. The competitors are similar to the proposed technology, yet are already available and in use in the field. This invention will need to present true disruption in order to become a viable alternative. In terms of substitutes, a sharp knife could be used to remove a cable jacket, although that is not the ideal way.



# Technology Readiness Level – Hardware

Technology Readiness Level Intent	Current TRL
The intent of this document is to determine the level of effort required to advance the technology from its current state to a desired future state. Project tasks may be proposed to assist in technology advancement. The <i>Technology Readiness Level (TRL) Deskbook</i> version July 2009 served as the reference document for the TRL assessment. TRLs run from 1 to 9.	3

## Research Methods

TRL determination has been conducted on applicable levels as seen below. The assessment was conducted by reviewing the following materials:

- Technology Overview
- Patent No. 9,230,717
- Q&A call with inventor

## Findings

The Cutting Device for Removing a Cable Jacket is a cutting device that is fast, precise, and easily operated to remove thick jacket material from cabling. The device has not been developed, prototyped, or tested, resulting in categorization as TRL 3. In terms of Commercial Off-The-Shelf (COTS) parts, it is expected that the first prototype could use mostly COTS parts, but that cannot be confirmed until the device is built. A Technical Data Package (TDP) and Bill of Materials (BoM) have not been created for this invention at this time. Fabrication of a prototype is essential for advancing the TRL and validating the proof-of-concept design.

## Conclusions

This invention remains at a very low TRL level and will require several steps to advance the TRL. Developing a prototype, creating a TDP and BOM, and testing the prototypes in an operational environment will be required.

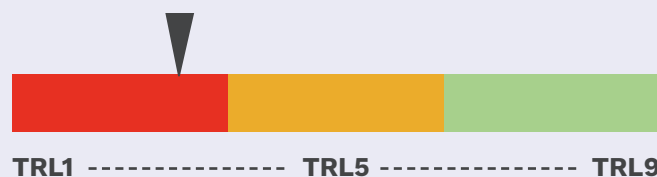
# Technology Readiness Level – Hardware (cont.)

## Recommendations

### Priority Key:

- **Must:** A critical and time sensitive recommendation to advance technology with respect to the area of focus.
- **Should:** An important recommendation to advance technology but is dependent upon predecessor recommendations or is not time sensitive.
- **Could:** A recommendation that will have insignificant impact on advancing the technology but could be a beneficial consideration.

Recommendations to advance TRL to 9	Priority	ROM Cost	ROM Timeline
Finalize design and build TDP and BOM	Must	\$1,000	1 month
Build prototype	Must	\$2,500	2 months
Test prototype in operational environment	Must	\$1,500	1 month
Integration of components	Must	\$1,000	1 month
Integration with existing systems	Should	\$1,500	1 month
Third party TRL revision	Could	\$2,500	2 months
Finalize TDP and BoM	Must	\$1,000	1 month
Design for manufacturing	Should	\$1,500	1 month
<b>ROM Total</b>		<b>\$10,000</b>	<b>6-8 months</b>



Analyst: DVIRC

# Manufacturing Readiness Level

Manufacturing Readiness Level Intent	Current MRL
The intent of this assessment is to determine the level of effort required to advance the technology from its current state to desired future state. Project tasks may be proposed to assist in the advancement of the technology. The <i>Manufacturing Readiness Level (MRL) Deskbook</i> version 2.0 served as the reference document for the MRL assessment. MRLs run from 1 to 10.	2

## Research Methods

Although a contractor has not been identified, an MRL determination has been conducted on applicable levels as seen below. The assessment was conducted with the following events and materials:

- Q&A interview with the inventor
- Patent No. 9,230,717

## Findings

The MRL will generally track with the TRL but be slightly lower. The following is an assessment of the technology's current MRL and reasoning for the rating.

The Cutting Device for Removing a Cable Jacket has not been developed, prototyped, or tested, categorizing it as MRL 2; manufacturing concepts only have been identified. The Cutting Device for Removing a Cable Jacket would be made of an M-shaped member, a horizontal crossmember, a first blade, a second blade, a third blade, a Kellum-based mechanism, and a ratcheting mechanism. A Technical Data Package (TDP) and Bill of Materials (BoM) have not been created for the invention at this time.

There are not expected to be any special or exotic material-, tool, or custom-manufacturing requirements to manufacture the device. In terms of Commercial Off-The-Shelf (COTS) parts, it is expected that most parts will be COTS, but that cannot be confirmed until the first prototype is built. The device itself will not need any approvals or accreditations. Supply chain issues are not expected as the device should be buildable with available materials. The invention does not require any software; this is a purely mechanical system.

## Conclusions

Since this invention is in its very early stages of development, there many steps needed to advance the MRL. The first step is to build a prototype for the invention and then test the prototypes in a lab environment followed by in a real-world environment. A more thorough MRL assessment should be completed when a supplier is identified, and an evaluation can be made in a production environment.

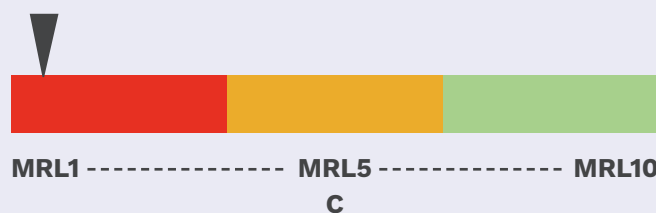
# Manufacturing Readiness Level (cont.)

## Recommendations

### Priority Key:

- **Must:** A critical and time sensitive recommendation to advance technology with respect to the area of focus.
- **Should:** An important recommendation to advance technology but is dependent upon predecessor recommendations or is not time sensitive.
- **Could:** A recommendation that will have insignificant impact on advancing the technology but could be a beneficial consideration.

Recommendations to advance MLR	Priority	ROM Cost	ROM Timeline
Develop TDP and BoM	Should	\$1,000	1 month
Create a cost model	Must	\$1,500	1 month
Scout assembly/COTS suppliers	Must	\$2,000	2 months
Create a Prototype	Must	\$2,500	2 months
Test the prototype	Must	\$1,500	1 month
Finalize manufacturer search	Must	\$750	1 month
Perform a Critical Design Review (CDR)	Should	\$1,000	1 month
Third party MRL revision	Could	\$2,500	2 months
Progress toward full-rate production	Should	\$2,500	2 months
Finalize Cost Model	Should	\$1,500	1 month
Complete Design for Manufacturing	Should	\$2,000	1 month
<b>ROM Total:</b>		<b>\$18,750</b>	<b>13-15 mos</b>



Analyst: DVIRC





**NAVSEA**

**Liberty  
Tech  
Bridge**

**DVIRC**

The result of an innovative partnership between the Naval Surface Warfare Center Philadelphia Division (NSWCPD) and the Delaware Valley Industrial Resource Center (DVIRC), Liberty Tech Bridge seeks to strengthen ties between the region's defense and industrial sectors. Together, NSWCPD and DVIRC are accelerating and expanding competitiveness among America's warfighters.



2905 Southampton Road  
Philadelphia, PA 19154

215-464-8550

[info@dvirc.org](mailto:info@dvirc.org)

[www.dvirc.org](http://www.dvirc.org)



/DVIRC\_PA



/dvirc.sepa



/company/dvirc/



/user/dvirc