



Electricity Human Resources Canada is a non-profit organization supporting the human resources needs of the Canadian electricity sector.

---

# Job Demands Assessment: Blade Repair Technician



This project is funded by the Government of Canada's Sectoral Initiatives Program.

# Job Demands Assessment: Blade Repair Technician

The purpose of a Job Demands Assessment (JDA) is to document the bona fide essential duties of a task. These assessments can be used for:

- Return to work planning
- Allowing medical professionals to evaluate job offers for suitability
- Determining job and task suitability
- Determining the likelihood that a job or task contributed to an injury
- Assisting Rehabilitation Specialists set up effective treatment protocols
- Training employees
- Hiring practices and Post Offer Pre-employment hiring programs
- Identifying ergonomic hazards

## Using the JDA

This JDA is purposely generic in nature to ensure applicability across various organizations. The JDA is meant to serve as a benchmark document that provides an overview of the most common physical demands associated with the occupation. Not all tasks could be observed during the assessment process; instead, the most common tasks have been assessed.

Where applicable, potential accommodations are noted to illustrate alternative means for achieving the required demand or action.

This JDA can be used by Medical Practitioners / Health Care Providers involved in return to work rehabilitation support, and workplace accommodations to identify the Major Essential Demands that can be Performed, Modified, or Avoided by an individual based on their capacity and ability.

## Acknowledgements

This JDA was completed by [ERGO Inc.](#), an Ergonomics, Injury Prevention & Safety Consulting & Training Firm that has been providing Canadian companies with practical ergonomic and injury prevention solutions for over 25 years.

Electricity Human Resources Canada and ERGO Inc. would like to thank [Acuren](#) for allowing us onsite to complete the JDA in Goderich, ON (November, 2021).

Position: **Blade Repair Technician**

Date of On-Site Assessment: **November 22 & 23, 2021**

## General Information

|                         |  |   |
|-------------------------|--|---|
| <b>Job Description</b>  | <p><b>Statement of Overall Job Description:</b> Blade Repair Technicians are responsible for making repairs to the internal or external surface and structure of a wind turbine blade.</p> <p>&gt;95% of repairs take place in place, at height, but a small proportion may be done with the blade laid down at the site or at an offsite shop. Technicians are often specialized in either internal or external repairs. External repairs may be performed from a blade access platform, from a crane basket, or via rope access. Internal repairs are performed by climbing through the blade hatch, either from the nacelle or via a traverse on the external surface of the nacelle.</p> <p>While some Technicians work in a dedicated role at a specific site, the role typically involves substantial travel, both within Canada and to sites outside the country.</p> <p><b>Tasks of a Blade Repair Technician include:</b></p> | <p><b>Approx. % of Time Spent Performing Each Task</b></p>                          |
|                         | <p>1. Set up – Verify lock out and inspect work area (completed at the start of every shift). For external repairs may include setting up blade access platform and all rigging (full shift), generator, and all materials and equipment. For internal repairs includes hauling equipment up tower (winch) and into the blade.</p>   | <p><b>Several hours to full shift</b></p>   |
|                         | <p>2. Accessing work area – Internal repairs require climbing of tower (ladder, ladder assist, elevator and/or external traverse) as well as climbing through hatches (may require removal of bolts). External repairs via blade access platform, crane basket, or rope access.</p>  | <p><b>Tower climb 10-20 minutes<br/>5-10 min to access blades</b></p>               |
|                         | <p>3. Grinding – Grinding of damaged area with angle grinder. Includes taking measurements of the area and layers removed.</p>   | <p><b>1-4 hours typical depending on size and depth, max. 12-16 hours</b></p>       |
|                         | <p>4. Lamination – Measuring and mapping of repair area, weighing and mixing of epoxy or polyester resin, cutting of core patch, fiberglass, application of resin and material with roller to remove air pockets. Several layers applied depending on depth of damage. Vacuum pump used to seal core.</p>  | <p><b>&lt;1 hour<br/>3+ hours of dry time (downtime), may be left overnight</b></p> |
|                         | <p>5. Sanding – Sanding of the repair area with orbital sander to ensure smooth edges and no defects.</p>  | <p><b>Typically 30-60 minutes, longer for larger areas</b></p>                      |
|                         | <p>6. Apply top coat – Dispense top coat from caulking style gun, mix, and apply over repair with spreader.</p>  | <p><b>Typically &lt;30 min<br/>2-3 hours off dry time (downtime)</b></p>            |
|                         | <p>7. Contour – Sand top coat with orbital sander ensuring perfectly smooth and contoured surface.</p>   | <p><b>1-2 hours for small repair, up to 6 hours for a 5' repair</b></p>             |
|                         | <p>8. Paint – Apply paint over repair with foam roller. Typically, 2 coats applied.</p>  | <p><b>30 min</b></p>  |
|                         | <p>9. Computer tasks – Record and upload all technical and safety documents at end of shift, e.g batch numbers, lot numbers of materials, time, weather conditions.</p>  | <p><b>Daily, 1-2 hours</b></p>  |
| <b>Division of Work</b> | <p>Technicians often work in teams, e.g. with an Operator, and a support person who typically performs the Confined Space Attendant role. If another team member is qualified as a Blade Repair Technician, then they may rotate tasks throughout the day to provide recovery time from the more demanding Repair role; however, it is not typical for two Technicians to be performing repairs at the same time.</p>  |   |
| <b>Work Load</b>        | <p>Typical repair on one blade takes 4-5 days, but varies with size of repair, size of team, and weather conditions.</p>   |   |

Position: **Blade Repair Technician**

Date of On-Site Assessment: **November 22 & 23, 2021**

## General Information

### Work Schedule

Varies by company. Typically day shift Monday – Saturday, 8-12+ hours shifts. During hot months, internal work may be performed at night. Crews may work 6 weeks on, 1 week off, and may be full time permanent staff or occasional workers. Seasonal layoffs January – March. Hours may be capped, e.g. 72 hours/week.

### Work Environment

**Description:** Work typically performed in teams, at heights, from a blade access platform, crane basket, or rope access for external repairs or in the case of internal repairs the Technician climbs the tower and accesses the blade from a hatch and potentially an external traverse. In-blade work performed within a tight confined space while kneeling/walking on a curved standing surface. Towers 80-132 m high, crawl 20-30 meters into blade.

**Working Heights:** Typically, floor to shoulder level. Over shoulder work rare. For external repairs, the blade access platform or crane basket can be raised/lowered to optimize the working height and in the case of in-blade work, the blade is rotated and positioned such that the work can be performed on a downward angle (lower surface of the blade). ~34" to lift items in/out of truck tailgate.

**Working Reaches:** Typically, <12-14". May be increased for external blade work, especially when crane basket cannot be positioned close to the blade.

Position: **Blade Repair Technician**

Date of On-Site Assessment: **November 22 & 23, 2021**

## Pictures of Main Job Tasks



Access via platform



Access via platform



Reach to blade from platform



Access via crane basket



Internal access via hatches



Internal – grinding



External – laminating



External - sanding

*Disclaimer: Not all tasks within the Blade Repair Technician occupation were being performed at the time of data collection. The data reported in this document is based on the measurement of available equipment, observation of repairs within a controlled shop environment, a review of field work photographs, as well as interviews with Blade Repair Technicians. This JDA may not be 100% representative of any one job site, as demands may vary based on Company and location.*

Position: **Blade Repair Technician**

Date of On-Site Assessment: **November 22 & 23, 2021**

## Summary of Major Essential Demands

*For further details refer to the tables on the following pages*

**To be completed by Health Care Provider — Please check one:**

|  | Able to Perform | Modification Required (Explain) | Unable to Perform |
|--|-----------------|---------------------------------|-------------------|
| Occasional <b>one- and two-handed lifting</b> (typical 4-40 lbs, max. 110 lbs alone, 200 lbs with 2 people) of tools and equipment, typically floor to shoulder, occasionally overhead. Blades can be accessed via a platform or crane basket that can be raised/lowered to optimize working height. |                 |                                 |                   |
| Occasional <b>one- and two-handed carrying</b> (typical 4-40 lbs, max. 110 lbs alone, 200 lbs with 2 people) as well as constant wearing of equipment weighing 30-40 lbs (including while ladder climbing). Typical walking distances 20-30 m at a time.   |                 |                                 |                   |
| Frequent <b>one- and two-handed horizontal pushing/pulling</b> with tools (8-14 lbs), occasional pushing/pulling of cables and hatches (10-20 lbs). Self-retracting lanyards may also place additional pull forces on the body (~5 lbs).   |                 |                                 |                   |
| Occasional <b>sitting</b> on chair, on ground (in blade, on platform), and in vehicle. Often while repair is drying, typically <30 minutes at a time, driving times may be longer.   |                 |                                 |                   |
| Occasional <b>standing</b> within the blade or tower during internal repairs, typically <30 minutes at a time and constant standing on the access platform during external repairs, up to several hours at a time. Surfaces may be uneven, curved, or slippery.                                      |                 |                                 |                   |
| Rare to occasional <b>walking</b> between the truck and tower; may be on uneven or slippery terrain. Walking within the tower, inside the blade (stooped walking) and for external traverses; surfaces may be uneven, curved, and/or slippery. Typically 20-30 meters at a time.                     |                 |                                 |                   |
| Frequent to constant <b>gripping/handling</b> with both hands to handle tools and equipment. Simulated grip of 30-50 lbs to climb ladder.  |                 |                                 |                   |
| Occasional <b>pinching/fingering</b> with one and both hands (negligible forces) to type, write, and spread top coat.  |                 |                                 |                   |
| Rare to occasional <b>squatting</b> , typically to enter/exit blade and for retrieving ground level items. <10 minutes at a time.  |                 |                                 |                   |
| Rare to frequent <b>kneeling</b> , typically while performing repairs within blade, for several hours at a time.   |                 |                                 |                   |
| Rare to occasional <b>climbing</b> of stairs, ladders, in/out of vehicles and through access hatches. Ascending tower (80-132 m) takes 10-20 minutes of climbing (climb assist may be available).  |                 |                                 |                   |
| Occasional to frequent <b>balancing</b> while climbing, walking on uneven terrain, standing on platform (may sway in wind) and working (standing, squatting, crawling, kneeling) on curved blade surface.  |                 |                                 |                   |
| ND to occasional <b>crawling</b> , up to 20-30 m to access internal repairs.   |                 |                                 |                   |
| Rare to occasional <b>driving</b> to the worksite. Typically, 30-90 minutes/shift; longer to travel to new work location.  |                 |                                 |                   |
| Moderate <b>back repetition</b> (all directions) with periods of static postures, particularly during internal work in tight spaces.   |                 |                                 |                   |
| Low <b>neck repetition</b> (all directions) with periods of static postures due to high visual demands, compounded by tight work spaces.   |                 |                                 |                   |
| Low <b>bilateral shoulder repetition</b> (all directions) with periods (up to 1 hour) of high repetition (climbing, sanding/grinding), and periods of <b>static postures</b> , particularly with larger repairs areas or when it is difficult to position the body as close to the repair.           |                 |                                 |                   |
| Low <b>bilateral elbow repetition</b> (all directions), with periods (10-20 min) of high repetition to climb ladders, and with static postures during tool use.  |                 |                                 |                   |
| Low <b>bilateral wrist repetition</b> (all directions) with some static wrist postures during tool use and while crawling.   |                 |                                 |                   |
| Excellent <b>visual acuity</b> and <b>attention to detail</b> (technical and for safety), as well as <b>team communication</b> critical to the task.   |                 |                                 |                   |



Position: **Blade Repair Technician**

Date of On-Site Assessment: **November 22 & 23, 2021**

| Demand / Action    |                                      | Check if Performed | Description & Potential Accommodations<br><i>*Accommodation options noted in green</i>  |
|--------------------|--------------------------------------|--------------------|---|
| Sensory            | <b>Hearing / Speech:</b>             |                    | In person, via cellphone and radio. To communicate with team (technical & safety information). Hand signals may be used with Crane Operators.   |
|                    | • Conversation                       | ✓                  |   |
|                    | • Signals                            | ✓                  | Air monitors, cell phone lightning alerts.  |
|                    | <b>Vision:</b>                       |                    | To inspect repairs to ensure quality standards are met. Surfaces must be perfectly smooth without imperfections.  |
|                    | • 20 inches or less                  | ✓                  | To drive vehicle on site, to set up equipment & rigging.  |
|                    | • 20 feet or more                    | ✓                  | To detect defects and damage to blade, e.g. air pockets are detected by changes in shadowing.   |
|                    | • Colour                             | ✓                  | To grind/sand to correct depth, to smooth and contour edges.  |
| • Depth Perception | ✓                                    |                    |   |
|                    | <b>Smelling</b>                      |                    | New blades may have residual styrene smell. Not required for task completion.   |
|                    | <b>Tactile / Feeling</b>             | ✓                  | To feel repair to ensure properly smoothed and contoured edges. To apply appropriate pressure while sanding/grinding.   |
| Environment        | <b>Conditions of Work</b>            |                    | External repairs performed at heights, outdoor conditions, all seasons. Internal repairs performed via climbing tower (ladder, ladder with assist, or elevator), and accessing via hatches (all sizes and shapes). May perform external traverse on the top of the nacelle or rope access external repairs. Work performed in confined space.       |
|                    | <b>Temperature / Humidity</b>        |                    | Exposure to all seasons and weather. Exposed to heat, cold, and wind. Internal blade work environment hot during summer months, portable A/C units, heaters, and dehumidifiers may be used, as well as air supplied respirators. Typically work not performed Jan-March, nor in high winds, lightning, substantial precipitation, or high humidity. |
|                    | <b>Noise</b>                         |                    | Grinding and sanding produce noise. Hearing protection worn. Noise levels not measured.   |
|                    | <b>Vibration</b>                     |                    | Exposure to hand/arm vibration from grinders and sanders. Typically 2-4 hours/shift. Peak 6-8 hours/shift.  |
|                    | <b>Walking / Working Surface</b>     |                    | Uneven terrain at base of tower (gravel, soil, ice), metal work platforms, inside of blade is a curved standing/working surface which may have oil or tripping hazards along the length. Access via hatches and areas with limited hand and footholds. Surfaces may be slippery, especially external traverse. Surfaces sway in wind.               |
|                    | <b>Lighting</b>                      |                    | Use of headlamps and portable lighting. Dark inside blade lit only by lights brought in.  |
|                    | <b>Electrical</b>                    |                    | Involved in the lock-out of the blades. Use of electrical generator for tools and winches.  |
|                    | <b>Sharp Objects</b>                 |                    | Tools (grinder, oscillating cutter, utility knife). Potential for contact with sharp protrusions, e.g. hardened putty or resin while moving within the blade.   |
|                    | <b>Hot / Cold Hazards</b>            |                    | Outdoor work all season. Use of heated blankets for post-cure of resin. Heaters and halogen lights and tools may become hot to the touch. Resin presents potential for ignition hazard.   |
|                    | <b>Chemical / Dust</b>               |                    | Resin, adhesives, oil, acetone, fiberglass, paint, dust (particulate not otherwise specified).  |
| Tools              | <b>Moving Machinery / Equipment</b>  |                    | Work vehicle, trailer (with blade access platform), generator, winches, blade access platform.  |
|                    | <b>Hand / Sharp Tools</b>            |                    | Grinder, sander, oscillating cutter, utility knife, scissors, wrench.   |
|                    | <b>Personal Protective Equipment</b> |                    | Varies by task. Safety boots, eye protection, gloves, hearing protection, ½ mask, full mask, or PAPR respirator, fall arrest harness, self retracting lanyard, life line, Tyvek suit, high visibility vest, leather and nitrile gloves, knee/elbow pads, self rescue kit, blade rescue kit.   |
|                    | <b>Other Equipment / Supplies</b>    |                    | Generator, blower, dehumidifier, heater, vacuum pump, scale, lift bags, Megger (test equipment for lightning protection system), temp and wind speed meters, air monitors, generator, winches, fire extinguisher, camera, resin, fiberglass, paint, top coat, peel ply, foam or balsa core patches, heated blankets.                                |

Position: **Blade Repair Technician**

Date of On-Site Assessment: **November 22 & 23, 2021**

| Demand   |  | Rate Requirement   | Description of Tasks that Demand is Required & Potential Accommodations<br><i>*Accommodation options noted in green</i>   |
|--|--|--|---|
| Legend: NE = Not Essential   ND = Not Daily but essential   5% or less = Rare Essential   6-33% = Minor Essential Demand   >33% = Major Essential Demand |  |  |   |
| Cognitive  | <b>Reading:</b>                        |  | Reading of work instructions, lamination plans, work logs, email/text messaging with team/engineers, safety documentation, material labels.<br>French documentation in some provinces.<br>Spanish is an asset for some clients.   |
|  | • English                              | Minor  |   |
|  | • French                               | Varies by Province   |   |
|  | • Other                                | NE   |   |
|  | <b>Writing:</b>                        |  | Completion of safety and technical documentations, on paper and on computer. Email/text messaging with team.<br>French documentation in some provinces.<br>Spanish is an asset for some clients.  |
|  | • English                              | Minor  |   |
|  | • French                               | Varies by Province   |   |
|  | • Other                                | NE   |   |
|  | <b>Verbal Communication:</b>           |  | With team including Operators, other Technicians, Confined Space Attendant, Engineers, Crane Operator, by phone, radio, in person. Hand signals may also be used.<br>French documentation in some provinces.<br>Spanish is an asset for some clients.   |
|  | • English                              | Major  |   |
|  | • French                               | Varies by Province   |   |
|  | • Other                                | NE   |   |
|  | <b>Supervising Others</b>              | Major  | Responsible for the safety of their team. The Blade Repair Technician is typically the "Lead" in a repair team.   |
|  | <b>Working to Speed</b>                | Major  | Repair work is time sensitive as there is pressure to get units back online. Due to high level safety and quality requirements, time is taken to perform the tasks carefully. Repairs have specified expected completion times, but Technicians have some control over their task pacing. Down time occurs during drying time for resin and top coat. |
|  | <b>Self-Supervision/ Working Alone</b> | Minor  | Work is always performed in a team. For internal repairs, the Technician may work alone within the blade with the rest of the team outside the blade.   |
|  | <b>Computer Usage</b>                  | Minor  | Daily to record repair information, including materials used, weather conditions, completion/upload of safety documentation, etc.   |
|  | <b>Math:</b>                           |  | Calculations of repair & overlap area based on number of layers, calculation of ratios for resin. Typically performed in the head.  |
|  | • Simple                               | Minor  |   |
| • Complex  | NE                                     |  |   |
| <b>Memory:</b>   |  | To track the progression of tasks, both from a safety and technical standpoint to ensure each step completed accurately before moving on. Procedural information – both technical repair procedures (reference manuals & work instructions available) and safety procedures.   |   |
| • Short Term   | Major                                  |  |   |
| • Long Term  | Major                                  |  |   |
| <b>Organization</b>  | Major                                  | Required to ensure all steps are completed in order and to technical and safety requirements.  |   |
| <b>Decision Making</b>   | Minor to Major                         | Varies by company. Technician may make all decisions about type of resin, number of layers, and when repair is complete to quality standards. Alternatively, may take photos and send to Engineer who prepares the lamination plan and approves each step before task progresses. Responsible for safety sensitive decisions during the performance of tasks (e.g. stop work due to wind). |   |
| <b>Attention to Detail</b>   | Major                                  | Critical for safety of self and team, and for completion of tasks to quality standards. Ability to detect very small variations in contour of repair. Resin mixing errors can result in fire.  |   |
| <b>Problem Solving</b>   | Minor to Major                         | Varies by company. Technician may make all decisions about how to make a repair or may be made by Engineering group. Responsible for problem solving in the event of an unexpected incident, e.g. onsite rescue.   |   |
| <b>Emergency Management</b>  | ND (but critical)                      | Responsible for self-rescue and rescue of team under any given condition. EMS not typically available until the team is back on the ground.  |   |



Position: **Blade Repair Technician**

Date of On-Site Assessment: **November 22 & 23, 2021**

| Demand / Action   |                     | Check if Performed | Duration   | Frequency  | Description & Potential Accommodations<br><i>*Accommodation options noted in green</i>  |   |
|---|---------------------|--------------------|--|--|---|---|
| Legend: NE = Not Essential   ND = Not Daily   Rare = 1-5%   Occasional = 6-33%   Frequent = 34-66%   Constant = 67-100% |                     |                    |  |  |   |   |
| Strength  | Lifting             | Two Hands          | ✓  | Occasional<br><i>Note: does not include tool holding time (see gripping below)</i> | Set up days @ start of repair require higher frequency of lifting.<br>Typically, 20-25 items over 20 lbs/shift, shared by 2-3 employees.  | <b>Objects:</b> Blower (15.6 lbs + 20 lbs hose), Megger (11.8 lbs + 24.8 lbs cable), dehumidifier (33.4 lbs), platform weights (55 lbs), roll of fiberglass (10-100 lbs), vacuum pump (31.2 lbs), pail epoxy (41-66 lbs – may decant to smaller container), platform lift bar (75 lbs), cable reel (60 lbs), power cable (110 lbs), tag line (41 lbs), lift bags (100-200 lbs – 2-person lift), paint (7.7 lbs), tools: rollers, tape measure, mixing tray, ruler, grinder, sander, oscillating cutter (1 – 5 lbs), various rescue kits (10-15 lbs), PPE (see worn objects below).<br><b>Weight Max:</b> 110 lbs alone, 200 lbs with 2 people   <b>Weight Typical:</b> 4-40 lbs<br><b>Range of Lift:</b> Floor to shoulder, occasionally overhead (typically lighter items) |
|   |                     | One Hand           | ✓  |  |   |   |
|   | Carrying            | Two Hands          | ✓  | Occasional   | Set up days @ start of repair require higher frequency of carrying between vehicle and tower (30 m)<br>Typically 20-25 items over 20 lbs/shift, shared by 2-3 employees<br><i>Safety equipment worn constantly</i>                                | <b>Carried Objects:</b> See above.<br><b>Worn Objects:</b> harness (7 lbs), ladder assist (3.4-3.8 lbs), helmet (1.8 lbs), double leg lanyard (7 lbs), self-rescue kit (10.8 lbs), self retracting lanyard (11 lbs), may also tether tools to body (may tether to platform)<br><b>Weight Max:</b> 110 lbs alone, 200 lbs with 2 people<br><b>Weight Typical:</b> 4-40 lbs carried, 30-40 lbs worn<br><b>Distance:</b> Typically 20-30 m   <b>Handles Present:</b> Varies  |
|   |                     | One Hand           | ✓  |  |   |   |
|   | Pushing/Pulling     | Two Hands          | ✓  | Frequent<br><i>(with tools)</i>  | May use sander or grinder for 4+ hours/shift.   | <b>Objects:</b> Tagline (to adjust platform position, not measured), pull up to climb ladder (assist may be available), hoist cables up (not measured), self retracting lanyard exerts pull back force of ~5 lbs on body, forward/downward push with sander/grinder (8-14 lbs), open hatch (10-20 lbs)<br><b>Force Max:</b> Not available   <b>Force Typical:</b> 8-20 lbs<br><b>Distance:</b> Stationary arm work   <b>Handles Present:</b> Varies   |
|   |                     | One Hand           | ✓  | Occasional<br><i>(other)</i>   |   |   |
| Mobility  | Sitting             | ✓                  | Occasional   | Intermittent   | Typically, during down time, when repair is drying. On ground, in vehicle or chair.   |   |
|   | Standing            | ✓                  | Occasional<br><i>(Internal)</i><br>- Constant<br><i>(External)</i> | External: Majority of day<br>Internal: Intermittent                                | External: Up to several hours at a time on work platform.<br>Internal: Typically <30 min at a time.   |   |
|   | Walking             | ✓                  | Rare – Occasional  | Intermittent throughout day.   | Between truck/supplies and tower, typically 30 meters. Higher on set up days.<br>Stooped walking within the blade, walking for external traverse – may be slippery.   |   |
|   | Foot Activation     | ✓                  | Rare – Occasional  | Start and end of shift.  | To access site via truck. Typically 30-1.5 hours on a daily basis. May travel 4-8 hours to a site and then stay locally.  |   |
|   | Crouching/Squatting | ✓                  | Rare <i>(External)</i><br>- Occasional<br><i>(Internal)</i>        | Internal: 10-20x/shift   | Crouched walk to enter/exit blade, crouch/squat to work, <10 min at a time, will kneel to perform repairs. Surface may not be level.  |   |
|   | Kneeling            | ✓                  | Rare <i>(External)</i><br>- Frequent<br><i>(Internal)</i>          | Internal: for several hours at a time  | To perform work within blade. Knee pads may be worn. Surface may not be level.  |   |
|   | Climbing            | ✓                  | Rare <i>(External)</i><br>- Frequent<br><i>(Internal)</i>          | External: Into work platform 2-4/shift<br>Internal: Ascend tower 2-4x/shift        | Climb over railing into work platform. Ascending tower (80-132 m) takes 10-20 min, may have climb assist. Climb in/out of work van or truck. Through various sized access hatches (horizontal and vertical entry) with limited hand or footholds. |   |
|   | Balancing           | ✓                  | Occasional - Frequent  | Intermittent throughout the shift.   | While climbing, walking, working on uneven terrain or internal curved blade surface. While working – blades and work platform may sway in the wind.   |   |

Position: **Blade Repair Technician**

Date of On-Site Assessment: **November 22 & 23, 2021**

| Demand / Action   |  | Check if Performed | Duration                                 | Frequency  | Description & Potential Accommodations<br><i>*Accommodation options noted in green</i>   |
|---|--|--------------------|--|--|--|
| Legend: NE = Not Essential   ND = Not Daily   Rare = 1-5%   Occasional = 6-33%   Frequent = 34-66%   Constant = 67-100% |  |                    |  |  |  |
| Mobility  | <b>Crawling</b>                        | ✓                  | ND (External)<br>Occasional - (Internal) | Internal: 5-10x/shift  | Typically <5 min at a time to enter/exit blade. Crawl up to 20-30 m into blade, including military crawl in tight areas. May lay prone for some repairs (rare).  |
|   | <b>Gripping/Handling (Gross motor)</b> |                    |  |  |  |
| Dexterity   | Right Hand                             | ✓                  | Dominant: Constant                       | Intermittent throughout the shift. May alternate hand using tool to reduce fatigue.                                | <b>Objects:</b> Rigging/carabiners (4-5 lb press with thumb), tools (grinder, sander, roller), equipment, ladder rungs, steering wheel. See lifting above.<br><b>Force Max:</b> 50-60 lbs   <b>Force Typical:</b> 10-30 lbs<br><b>Simulated grip force:</b> Climb ladder (30-50 lbs), grip grinder (10 lbs), top coat dispenser (55 lbs @3.75" grip span). |
|   | Left Hand                              | ✓                  | Non-dominant: Frequent                   | Sander & roller typically 1 hand static grip Grinder typically 2 hand static grip.                                 |  |
|   | Either                                 | ✓                  |  |  |  |
|   | <b>Pinching/Fine Finger Movement</b>   |                    |  |  |  |
|   | Right Hand                             | ✓                  | Dominant: Occasional                     | Typically perform computer work for 1-2 hours in the evening to document repairs and upload safety documentations. | <b>Objects:</b> To type, to handle sheets of fiberglass, to use pen, top coat spreader.<br><b>Weight:</b> Negligible   |
|   | Left Hand                              | ✓                  | Non-dominant: Occasional                 |  |  |
|   | Either                                 | ✓                  |  |  |  |
| <b>Hand/Eye Coordination</b>  |  | ✓                  | Frequent                                 | Intermittent through the shift.  | While sanding, grinding, applying fiberglass, top coat and paint. To climb ladders and through access hatches.   |

Position: **Blade Repair Technician**

Date of On-Site Assessment: **November 22 & 23, 2021**

| Demand / Action                         |                                     | Check if Performed   | Typical Posture Range of Motion (°)   | Typical Repetition Rate/Hour   | Description & Potential Accommodations<br><i>*Accommodation options noted in green</i> |
|---|-------------------------------------|--|---|--|--|
| <b>Neck Movement</b>                    |                                     |  |   |  |  |
| • Flexion (bent forward)                | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> <20° <input checked="" type="checkbox"/> 20-45° <input type="checkbox"/> >45°            | <input checked="" type="checkbox"/> <120 <input type="checkbox"/> 120-180 <input type="checkbox"/> >180 <input checked="" type="checkbox"/> STATIC            | Near neutral for majority of external repairs. Static neck flexion for visual demands during internal work.  |  |
| • Extension (bent backwards)            | <input checked="" type="checkbox"/> | <input type="checkbox"/> <5° <input checked="" type="checkbox"/> >5°   |   | Extension, dynamic and static while setting up rigging.  |  |
| • Rotation (twist)                      | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> <45° <input type="checkbox"/> >45°   | <input checked="" type="checkbox"/> <120 <input type="checkbox"/> 120-180 <input type="checkbox"/> >180 <input checked="" type="checkbox"/> STATIC            | Static twisting may be required for visual access of entire repair.  |  |
| • Lateral Flexion (bent to side)        | <input checked="" type="checkbox"/> | <input type="checkbox"/> <5° <input checked="" type="checkbox"/> >5°   | <input checked="" type="checkbox"/> <120 <input type="checkbox"/> 120-180 <input type="checkbox"/> >180 <input checked="" type="checkbox"/> STATIC            | Static bending may be required for visual access in tight spaces.  |  |
| <b>Back Movement</b>                    |                                     |  |   |  |  |
| • Flexion (bent forward)                | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> <20° <input checked="" type="checkbox"/> 20-45° <input checked="" type="checkbox"/> >45° | <input type="checkbox"/> <12 <input checked="" type="checkbox"/> 12-120 <input type="checkbox"/> >120 <input checked="" type="checkbox"/> STATIC              | Near neutral for majority of external repairs. Static back flexion, all ranges for internal work.  |  |
| • Extension (bent backwards)            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> <5° <input type="checkbox"/> >5°   |   | Mild extension may occur while setting up rigging.   |  |
| • Rotation (twist)                      | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> <15° <input checked="" type="checkbox"/> 15-30° <input type="checkbox"/> >30°            | <input type="checkbox"/> <12 <input checked="" type="checkbox"/> 12-120 <input type="checkbox"/> >120 <input checked="" type="checkbox"/> STATIC              | Static twisting may be required for access in tight spaces.  |  |
| • Lateral Flexion (bent sideways)       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> <20° <input checked="" type="checkbox"/> 20-45° <input type="checkbox"/> >45°            | <input type="checkbox"/> <12 <input checked="" type="checkbox"/> 12-120 <input type="checkbox"/> >120 <input checked="" type="checkbox"/> STATIC              | Static bending may be required for access in tight spaces.   |  |
| <b>Shoulder Movement (Dominant)</b>     |                                     |  |   |  |  |
| • Flexion (raised in front of body)     | <input checked="" type="checkbox"/> | <input type="checkbox"/> <45° <input checked="" type="checkbox"/> 45-90° <input checked="" type="checkbox"/> >90°            | <input checked="" type="checkbox"/> <90 <input type="checkbox"/> 90-150 <input checked="" type="checkbox"/> >150 <input checked="" type="checkbox"/> STATIC   | Periods (10 min to 1 hour) of repetitive movement to haul up cables (hand over hand), ladder climbing (over 90°) and while sanding/grinding. Sanding/grinding postures typically quick but small range and more repetitive in the dominant hand. |  |
| • Extension (raised behind body)        | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> <5° <input type="checkbox"/> >5°   |   |  |  |
| • Abduction (raised to side)            | <input checked="" type="checkbox"/> | <input type="checkbox"/> <45° <input checked="" type="checkbox"/> 45-90° <input type="checkbox"/> >90°                       |   |  |  |
| • Adduction (across body)               | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> <45° <input type="checkbox"/> 45-90° <input type="checkbox"/> >90°                       | <input checked="" type="checkbox"/> <90 <input type="checkbox"/> 90-150 <input type="checkbox"/> >150 <input checked="" type="checkbox"/> STATIC              |  |  |
| • Rotation (turned in/out)              | <input checked="" type="checkbox"/> | <input type="checkbox"/> <5° <input checked="" type="checkbox"/> >5°   |   |  |  |
| <b>Shoulder Movement (Non-dominant)</b> |                                     |  |   |  |  |
| • Flexion (raised in front of body)     | <input checked="" type="checkbox"/> | <input type="checkbox"/> <45° <input checked="" type="checkbox"/> 45-90° <input checked="" type="checkbox"/> >90°            | <input checked="" type="checkbox"/> <90 <input type="checkbox"/> 90-150 <input checked="" type="checkbox"/> >150 <input checked="" type="checkbox"/> STATIC   | May reach behind the body to grasp tools and materials.  |  |
| • Extension (raised behind body)        | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> <5° <input type="checkbox"/> >5°   |   | Abduction typically to 90° with tool use (grind/sand/roller).  |  |
| • Abduction (raised to side)            | <input checked="" type="checkbox"/> | <input type="checkbox"/> <45° <input checked="" type="checkbox"/> 45-90° <input type="checkbox"/> >90°                       |   | Reaching to the side or across the body with a tool (abduction and adduction), particularly if the repair is wide and it is difficult to adjust a kneeling position within the blade.  |  |
| • Adduction (across body)               | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> <45° <input type="checkbox"/> 45-90° <input type="checkbox"/> >90°                       | <input checked="" type="checkbox"/> <90 <input type="checkbox"/> 90-150 <input type="checkbox"/> >150 <input checked="" type="checkbox"/> STATIC              |  |  |
| • Rotation (turned in/out)              | <input checked="" type="checkbox"/> | <input type="checkbox"/> <5° <input checked="" type="checkbox"/> >5°   |   |  |  |
| <b>Elbow Movement (Dominant)</b>        |                                     |  |   |  |  |
| • Pronation/Supination (palm down/up)   | <input checked="" type="checkbox"/> | <input type="checkbox"/> Neutral <input type="checkbox"/> Partial <input checked="" type="checkbox"/> Full                   | <input checked="" type="checkbox"/> <120 <input type="checkbox"/> 120-180 <input type="checkbox"/> >180 <input checked="" type="checkbox"/> STATIC            | Static pronation to climb ladders, to type, and while sanding/grinding. Partial supination while grinding.   |  |
| • Flexion/Extension (bent/straight)     | <input checked="" type="checkbox"/> | <input type="checkbox"/> Neutral <input type="checkbox"/> Partial <input checked="" type="checkbox"/> Full                   | <input checked="" type="checkbox"/> <120 <input type="checkbox"/> 120-180 <input checked="" type="checkbox"/> >180 <input checked="" type="checkbox"/> STATIC |  |  |
| <b>Elbow Movement (Non-dominant)</b>    |                                     |  |   |  |  |
| • Pronation/Supination (palm down/up)   | <input checked="" type="checkbox"/> | <input type="checkbox"/> Neutral <input type="checkbox"/> Partial <input checked="" type="checkbox"/> Full                   | <input checked="" type="checkbox"/> <120 <input type="checkbox"/> 120-180 <input type="checkbox"/> >180 <input checked="" type="checkbox"/> STATIC            | Static extension where reach to the work surface is increased, e.g. basket is positioned further from blade due to wind.   |  |
| • Flexion/Extension (bent/straight)     | <input checked="" type="checkbox"/> | <input type="checkbox"/> Neutral <input type="checkbox"/> Partial <input checked="" type="checkbox"/> Full                   | <input checked="" type="checkbox"/> <120 <input type="checkbox"/> 120-180 <input checked="" type="checkbox"/> >180 <input checked="" type="checkbox"/> STATIC | Repetitive flexion/extension for periods 10-20 min while ladder climbing and occasionally with sanding.  |  |

Posture & Joint Position

Position: **Blade Repair Technician**

Date of On-Site Assessment: **November 22 & 23, 2021**

| Demand / Action                     |                                      | Check if Performed               | Typical Posture Range of Motion (°)         |   |  | Typical Repetition Rate/Hour   | Description & Potential Accommodations<br><i>*Accommodation options noted in green</i>   |  |
|-------------------------------------|--------------------------------------|----------------------------------|---|---|--|--|--|--|
| <b>Posture &amp; Joint Position</b> | <b>Wrist Movement (Dominant)</b>     |                                  |   |   |  |  |  |  |
|                                     | • Flexion/Extension (bent up/down)   | ✓                                | <input type="checkbox"/> Neutral            | <input type="checkbox"/> Partial            | <input checked="" type="checkbox"/> >½ range   | <input checked="" type="checkbox"/> <900 <input type="checkbox"/> 900-1800 <input type="checkbox"/> >1800 <input checked="" type="checkbox"/> STATIC | Moderate range of motion required for manipulation of tools, ulnar deviation most typical.<br><br>May fully extend wrist, especially while crawling and maneuvering within the blade.<br><br>Postures typically static, with some dynamic movements. |  |
|                                     | • Deviations (bent to side)          | ✓                                | <input type="checkbox"/> Neutral            | <input checked="" type="checkbox"/> Partial | <input type="checkbox"/> >½ range  | <input checked="" type="checkbox"/> <900 <input type="checkbox"/> 900-1800 <input type="checkbox"/> >1800 <input checked="" type="checkbox"/> STATIC |  |  |
|                                     | <b>Wrist Movement (Non-dominant)</b> |                                  |   |   |  |  |  |  |
|                                     | • Flexion/Extension (bent up/down)   | ✓                                | <input type="checkbox"/> Neutral            | <input type="checkbox"/> Partial            | <input checked="" type="checkbox"/> >½ range   | <input checked="" type="checkbox"/> <900 <input type="checkbox"/> 900-1800 <input type="checkbox"/> >1800 <input checked="" type="checkbox"/> STATIC |  |  |
| • Deviations (bent to side)         | ✓                                    | <input type="checkbox"/> Neutral | <input checked="" type="checkbox"/> Partial | <input type="checkbox"/> >½ range           | <input checked="" type="checkbox"/> <900 <input type="checkbox"/> 900-1800 <input type="checkbox"/> >1800 <input checked="" type="checkbox"/> STATIC |  |  |  |

This table outlines the most common and expected working postures. However, due to the nature of the tight and awkward spaces within the blades, as well as some of the tight and awkward access hatches, more extreme postures may occur than those noted above.

Position: **Blade Repair Technician**

Date of On-Site Assessment: **November 22 & 23, 2021**

## Optional Form

Can be used for Accommodation and Return to Work. To be completed by employee's medical practitioner/ health care provider (do not include diagnosis).

Employee's Name:

Are there any medical/health conditions that account for absence(s) from the workplace or would affect the employee's ability to perform his/her duties?

Yes  No

If yes, describe the employee's specific work-related limitations and/or restrictions.

Indicate duration of limitation(s) and/or restriction(s) identified above. Permanent  Temporary

If temporary, what is the expected duration?

Is employee involved in treatment and/or taking medication that may affect his or her ability to work, including regular attendance, and/or performing certain duties? Yes  No

If yes, describe the impact (i.e. medication may cause drowsiness, safety risk related to treatment, treatment requires intermittent absences from work.)

Are any further absences from work (e.g. surgery) anticipated at this time? Yes  No

If yes, please specify:

When is the date of your next assessment?

Name and address of medical practitioner/health care provider completing this form:

