

TSC Category	Special Processes					
TSC	Composite Structures Design and Maintenance					
TSC Description	Design and maintain aircraft composite structures using appropriate resources. It includes designing composite structures and repair schemes, identifying composite defects as well as performing repairs in accordance with structural repair manuals and organisational procedures.					
TSC Proficiency Description	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
	AER-ACO-1034-1.1	AER-ACO-2034-1.1	AER-ACO-3034-1.1	AER-ACO-4034-1.1		
	Carry out maintenance and repair works on aircraft composite structures using appropriate tools, equipment, materials and methods	Analyse sources and causes of failures to recommend appropriate repair techniques and restore the integrity of the composite structures	Conduct failure analyses to determine failure modes and identify root causes of damages in aircraft composite structures	Design composite structures with required mechanical properties such as strength and stiffness for a specific application and operating environment		
Knowledge	<ul style="list-style-type: none"> • Types of composite structures • Composite terminologies • Types of composite defects and damages • Classifications of repair • Composite repair processes • Structural repair manuals • Hazardous nature of composites • Handling and storage of composite materials • Usage of personal protective equipment • Types and purposes of maintenance documentation • General airworthiness requirements • Workplace safety and Health (WSH) Act • Environmental standards 	<ul style="list-style-type: none"> • Material characterisation methods • Macro-mechanical behaviour of laminates • Composite failure modes and classification of damage on composites • Composite damage repair assessment techniques • Types of non-destructive testing (NDT) methods • Composite repair methods, techniques and processes • Methods for laminate repair design • Methods for core and bonded joint repair design • Mechanically fastened joints • Challenges of composite repairs 	<ul style="list-style-type: none"> • Advanced material characterisation methods • Fundamentals of failure analysis • Composite failure analysis and failure investigation processes • Advanced non-destructive testing (NDT) for damage detection • Common causes of composite failure • Theoretical and experimental evaluation of mechanical properties of composites • Micro-mechanics and macro-mechanics of composite failure • Delamination behaviour of composites • Techniques for measurement of fracture toughness for composites • Concepts of fatigue damage of laminated fibrous composites 	<ul style="list-style-type: none"> • Concepts of product design and development • Materials selection and properties • Macro-mechanical behaviour of laminates • Environmental effects on composite structures • Composite failure modes and remedies • Advanced principles of composites design • Calculation methods for the design of composites • Design of sandwich structure • Design for green composites • Design for manufacturing • Basic simulation models for the design of composites • Challenges and opportunities in designing with composites 		

**SKILLS FRAMEWORK FOR AEROSPACE
TECHNICAL SKILLS AND COMPETENCIES (TSC) REFERENCE**

<p>Abilities</p>	<ul style="list-style-type: none"> • Examine defects in composite structures • Prepare to repair composite defects • Perform wet and dry lay-up of composite materials • Perform non-destructive test (NDT) as per instructions to identify damage areas • Perform composite repair as per work instructions • Document maintenance and repair tasks • Adhere to technical manuals and regulatory requirements • Observe and apply safety practices in the workplace 	<ul style="list-style-type: none"> • Explain fundamental concepts of composite repair • Interpret types and classification of damage on composites • Assess the need for composite repairs • Conduct repair assessment on composite structures • Interpret the type of repair design required from work plans • Select appropriate repair technique • Recommend appropriate repair methods based on evaluation of repair assessment, repair design requirement and repair techniques • Develop repair plan and work instructions • Incorporate safety, health and environmental considerations in repair plans 	<ul style="list-style-type: none"> • Apply material characterisation methods to composites • Select appropriate NDT methods for damage detection • Select appropriate composite testing and failure analysis methods • Evaluate non-standard tests used in specific applications • Assess the micro-mechanics and macro-mechanics of failure • Interpret the results of composites testing under anisotropic conditions • Assess the delamination behaviour of composites • Interpret results obtained from the macro-mechanical analysis of a laminated composite • Identify failure modes related to moisture diffusion • Determine fracture toughness • Evaluate the failure analysis to determine the root cause of failure 	<ul style="list-style-type: none"> • Analyse laminate, failure criterion, sandwich structure • Formulate design considerations with respect to mechanical behaviour of lamina • Formulate design considerations with respect to failure modes of composite materials • Resolve fabrication and design problems associated with sandwich structures • Evaluate impact of environment on the performance of composite structures • Analyse impact of design considerations on final composite performance • Recommend composite design options and methods • Execute composite design calculations • Develop simulation models for the design of composites • Recommend material selection for composite design • Design for green composites • Design for ease of manufacturing and assembly 		
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