ANNEXURE-A

PUBLICATIONS

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   A.1.2 International conferences
   A.1.3 National conferences
   A.1.4 Publication under review

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   A.2.2 International conferences
   A.2.3 National conferences

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A.1.1 Journals


A.1.2 INTERNATIONAL CONFERENCES


A.1.3 NATIONAL CONFERENCES

A.1.4 PUBLICATION UNDER REVIEW


3. Singh, D and A Rajaraman, “Role of damage parameters in remaining life assessment” *sent for JI Aero Soc India*

A.2 SAMPLE PAPERS OF PUBLICATIONS
A.2.1 JOURNALS

Shear Characterisation of Woven Carbon/Epoxy Composite Under Various Adverse Environments

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ABSTRACT: In this study, an investigation into the shear properties of bi-directional carbon fibre reinforced composite has been carried out by 'slip shear' test method (EN4175). The specimens were tested under various adverse environmental conditions after subjecting them to different durations of exposure. A comparison between time dependent degradation of the shear properties of the material with respect to virgin shear properties is made, and the results have been analysed with emphasis on material weight gain or loss under those adverse environments.

KEY WORDS: adverse environment, real shear tests, shear modulus, shear strength, woven carbon/epoxy composite

INTRODUCTION

Strength and stiffness of composite materials are two favourable properties that are used to full extent in various structural applications under different kinds of loadings. One of the essential requirements for this effective usage is the need to understand the behaviour of these materials under different loading and environmental conditions. Any uncertainty in this regard will result in improper utilisation of the material properties, and will result in showing a larger margin of safety in design. Now, with loadings and environments to which these composites are subjected to are so varied and complex, a complete understanding of the material properties over the entire range of loads and environments is necessary. This will help considerably in advanced analysis and design procedures, and in predicting efficient material utilisation. Furthermore, the distinguishing feature of unidirectional composites is that they have high strength and high modules in the direction of the fibres. This is an advantage when the state of stress can be accurately determined and laminate can be fabricated with more, having strength that can match the design needs. However, in application, where the state of stress may not be predictable or where the stresses are predominantly equal in all major directions of loading, there is a need to develop composites that have approximately equal strength in all directions. In this context, the bi-directional carbon. Non-motorised composites have attracted the attention of researchers and scientists. In this study, the analysis and design requirements under multidirectional loadings and also exhibit deviation of the material. Even though number of materials are available, for such composites, specific environmental and load conditions like selective stress exaggeration of shear loads will be different. These results are applicable for many different fields, and this study relates to such cases.

The specific requirements for load and environment are different from the commonly used shear designs and loadings in open air. For example, the tests that are used for shear loadings are satisfactory for metallic structures and when they are used with
Role of damage parameters in remaining life assessment of composites in Aircraft structures

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\textsuperscript{b}Professor, Hindu University, OMR, Pudur, Chennai, India-603103

Abstract

Composites are being used in variety of applications ranging from aerospace-where the usage is prose- to even microprocessors. Most of these composites are made of either different material with a matrix for binding or with fibers embedded in a composite matrix. The characteristics of material properties of composites are mostly experimental with analytical modelling used to simulate the system behaviour. In this study a typical composite— with characteristics as given in one of the earlier papers of the author is used to simulate the behaviour to study remaining life assessment—RUA— of the composites to enable one to design suitably. The damage is simulated in the form of hair-line cracks, introduced on the surface of the coupons used for testing. This investigation has been carried out on carbon fiber reinforced composite, manufactured by IPCL Boroda (India) with trade name INDICARF-30. The fibers are plain weave with 13-15 ends per inch in both wrap and weft direction. The epoxy resin used was Araldite LY-5052, hardened by Hardener HY-5052 (products of Ciba-Geigy India Ltd) with 100:38. Tests were conducted on undamaged and damaged specimens classified into vertical inclined and horizontal cracks and continuous and discontinuous loading was used to simulate normal and loading-unloading states in actual systems. Based on the experimental results, different values of E for the composite termed as E\\textsubscript{en}, E\\textsubscript{nc}, E\\textsubscript{uc}, E\\textsubscript{dc}, are obtained and used in analytical studies carried out using ANSYS to simulate stiffness decay. Using stiffness decay RLA was computed and curves are given to bring the influence of different parameters.

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Key words: Composites; Life Time Assessment; Experimental Tests; Damage; Smart Structure
REMAINING LIFE ASSESSMENT OF DAMAGED REINFORCED COMPOSITES UNDER INELASTIC MATERIAL BEHAVIOUR

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²Department of Civil Engineering, Hindustan University, Chennai, India
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ABSTRACT

In this article, an investigation on bi-directional carbon fiber composite INDCARF manufactured in India - to study remaining life assessment-RLA- of the composites to enable one to design suitably. But since composites are made of different materials bonded and reinforced with fibres, they develop distress in the form of cracking and damage while in service and there is a need to assess their performance in terms of strength and stiffness for the remaining portion of their life. The cracking/damage under different conditions is simulated in the form of hair-line cracks, introduced on the surface of the coupons used for testing. Based on coupon test results, analytical studies using non-linear finite element model were carried out to assess the influence of different characteristics of damage on failure and remaining life. The cracking parameters were identified as initiation, spread and inelastic material behavior using elastic-plastic material model. The samples were evaluated by tensile tests according to the ASTM D3039.

Keywords: composites, remaining life assessment, damage, cracking, finite element analysis, tensile test.

1. INTRODUCTION

Carbon fabric reinforced composite structures are increasingly used for manufacturing components as flaps, ailerons, landing-gear doors, and other artefacts used in aeronautical industry to meet the demand for lightweight, high strength/stiffness and corrosion-resistant materials in domestic appliances, aircraft industries, etc. Usage of composites in defense and space applications [1] is increasing day by day with new materials and easy methods of manufacturing composites. But the major factor which needs to be looked into is the performance of these composites when distress or damage due to variety of reasons [2] occurs in the systems where they are used. All aircraft and aerospace vehicles during their service life are subjected to severe structural and aero dynamic loads, which may result from repeated landings and takeoff, maneuvering, ground handling and environmental degradation such as stress corrosion. These loads can cause damage or weakening of the structure especially for an aging aircraft thereby affecting its load carrying capabilities and safe life. Strength and stiffness of composite materials [3] are two favourable properties that are used to their full extent in various structural applications under different kinds of loading. First the “long term” behaviour that involves extended exposure of the component to applied condition that may include mechanical, thermal, chemical environment. Second, since the “end life” is defined by the reduction of strength, the study the effects of cracking and damage on remaining life.

2. EXPERIMENTAL PROCEDURE

2.1. Materials details

This investigation has been carried out on bi-directional carbon fiber reinforced composite manufactured by JPL Baroda (India) with trade name INDCARF-39. The fibers are plain weave with 13-15 ends per inch in both warp and weft direction. The properties of weaved carbon fiber fabric are mentioned in Table-1. The epoxy resin used was Araldite LY-5952, hardened by Harden 611 (produced by Cro-Geigy India Ltd) with 100:38. The composite plates were fabricated in the vacuum bag technique and cured at room temperature for 24h and post - cured at 100°C for 2h. The laminate made with eight layer of fabric have a nominal thickness of 2 mm corresponding to a fiber volume fraction of 55% (±3%). The basic properties of the fabricated carbon (epoxy) material are presented in Table-2.

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>200 gms</td>
</tr>
</tbody>
</table>

Table-1. The properties of bi-directional weaved carbon fiber fabric.
RESEARCH PAPER
Engineering

Remaining Life Assessment of Damaged Reinforced Composites Under Inelastic Material Behaviour

Dobin Singh
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ABSTRACT - A review of fatigue assessment techniques ranging from non-destructive quality control inspections on the raw materials to the more advanced methodologies of considering composite and their research going on in the field of composites. A closer look at the research going on in the field of composites. The discussion is based on the fatigue studies done on the material. Materials fatigue life and reliability are influenced by the microstructure, micro-cracks, type of environment, and load. In the field of composite materials, fatigue is a complex phenomenon as it is influenced by the properties of the material and the load. The paper presents a review of the current research on fatigue life assessment of composites, with a focus on the remaining life assessment of damaged reinforced composites under inelastic material behaviour.

1. INTRODUCTION

Composites are widely used in various industries due to their unique properties such as high strength-to-weight ratio, good corrosion resistance, and excellent thermal and electrical properties. They are used in aerospace, automotive, civil engineering, and sports equipment industries. Composites consist of a matrix material, which can be made of polymers, metal, or ceramic, and reinforcing fibers, which can be made of glass, carbon, or aramid. The reinforcing fibers are typically aligned in a specific direction to provide the desired mechanical properties. These fibers can be randomly oriented or aligned in a specific direction to provide the desired mechanical properties. These fibers can be randomly oriented or aligned in a specific direction to provide the desired mechanical properties. These fibers can be randomly oriented or aligned in a specific direction to provide the desired mechanical properties. 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A.1.2 INTERNATIONAL CONFERENCES

Studies on Crack Configuration and Initiation in Composites for Remaining Life Assessment

A.1.2.1 INTERNATIONAL CONFERENCES

CALL FOR PAPERS

A.1.2.2 INTERNATIONAL CONFERENCES

Figure 1 - Crack in a composite material.

Figure 1 shows the factors in crack propagation in a composite material. The factors include the material properties, the environmental conditions, and the load conditions. The propagation of the crack is influenced by these factors, which can affect the remaining life of the composite material.
Remaining Life Assessment of Composites with Damage

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Abstract

Composites have become an integral part of many engineering designs in recent years. Due to their unique properties, they are widely used in various industries. However, their use in aerospace and marine industries poses certain challenges, as they are sensitive to damage and require periodic inspection and maintenance. This paper focuses on the assessment of remaining life in composites with damage, using a non-destructive testing method. The study presents a method for evaluating the remaining life of composite materials under different loading conditions. The proposed method involves the use of ultrasonic testing, which provides accurate and reliable results. The results obtained from the proposed method are compared with those from other existing methods, and the study concludes that the proposed method is more effective in assessing the remaining life of composite materials. The methods for assessing the remaining life of composite materials are also discussed, along with the challenges and future research directions.
Role of damage parameters in remaining life assessment of composites in Aircraft structures
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Abstract:
Composite structures are being used in various applications ranging from small components to entire structures. A lot of these structures are made of either different materials with a matrix, for bonding or with fibers embedded in a composite matrix. The characterization of material properties of composites are mostly experimental with analytical modeling used to simulate the system behavior. In this study a typical composite with characteristics as given in one of the earlier papers of the authors is used to simulate the behavior to study remaining life assessment (RLA) of the composite to enable one to design failure. The damage simulation is performed in the form of tensile crack, introduced on the surface of the composite used for testing. The investigation has been carried out on carbon fiber reinforced composite manufactured by JPC, Bhopal (India) with trade name NDM-CFRP. The fibers are plain weave with 33-39 and per layer is both warp and weft direction. The epoxy matrix used was Araldite LY-5012, thinned by hardener HY-9512, produced of Ciba-Geigy, India Ltd with 100.50. Tensile were conducted on undamaged and damaged specimens, classified into vertical longitudinal crack and longitudinal cracks. The load was applied to simulate normal and transverse cracks. Tensile tests were conducted in an automated system. Based on the experimental results, different values of J for the composite turned in Eqn. 1. Ex values obtained and used in numerical analysis. The results are given in Fig. 2, to show the influence of different parameters

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Keywords: Composite, Life Assessment, Experimental Test, Damage, Stress Analysis
Residual Life Assessment of Composites with and without Damage

Alan Mustapha, Farooq Singh

Abstract—Composite have become an integral part of many engineering designs, beginning with aircraft to the current "smart sensors" concept, where the structure or component takes on an active part in the performance. The development of composite bioengineering with many materials to the materials sector has come a long way and now it is possible to take a composite to suit a performance criteria. The present study focuses on damage effects in composite and from the residual life assessment standpoint. It is conducted on a study of the stress field developed in the specimen under the application of the tensile loading. Experimental work was also conducted on composite coupons with and without damage that has fresh surface and material bonding as possible to reflect the current state of the composite component. The composite laminate is seen up with three different material modes. Flexure mode and static fatigue were carried in different angles and tests were conducted. This study is done to find out the damage of tensile strength of coupons with damage when compared to virgin coupons.

Keywords—Composite, damage, experimental work, life assessment, strain gauges

1. INTRODUCTION

The term composite is used to describe two or more materials that are combined in such a way that the resulting composite is stronger and stiffer than the individual components. A composite is composed of two elements, a matrix that serves as a binding substance, and reinforcing material. One of the phases is usually continuous, softer and stronger is called the reinforcement, whereas the other is called the matrix. The greatest advantage of using carbon composite is the high strength to weight ratio. Composites may be designed to be very flexible, having a wide range of mechanical properties. Carbon fiber and graphite are used in this study in reinforcing fibers which are well known for their good tensile strength.

A composite material is a combination of two or more materials in such a way that in proper proportion to get a single entity and improved qualities from the single material. Fiber reinforcement composite materials (FRP) are finding increased applications in aircraft, spacecraft, automotive fields and electrical industries, where its high strength to weight ratio and stiffness is suitable. Advanced composites are composite materials which are currently used in the aerospace industries now days. These composites have high performance requirements of a high-stress material such as epoxy and aluminum. Advanced composites or matrix materials have evolved as a result of combining developments in chemical bonding formula with new or existing forms of solid structural materials to form the high strength/low weight components and consequently in industries. Allen, Kinnaird, Heywood, and June (Ref. 2) found that doing tensile tests, the specimen will fail from the weakest link. The weakest link is unbreakable without testing. This failure can be observed anywhere in the specimen. In this study results strength of unidirectional composite samples is discussed. Tensile life assessment of coupons with and without damage is discussed here. Coupons are provided with different types of strain damage: notches, array, vertical, horizontal crack, delamination, and edge crack. Tensile tests are conducted on coupons having these kinds of damage and compared to tensile specimens without any damage. In order to find the damage in coupons, fine fibers, fibers layer, and Composite Form makes it possible that result having the worst arrangement must be aligned with the effort direction. This is done for the entire cracks or damages occur in the polyester matrix of the composite. An aircraft and aerospace industries are entering a new era, subject to severe structural and environmental loads, which may cause due to repeated landing and takeoff, maneuverability, ground handling and environmental degradation such as stress corrosion. These loads cause more damage by weakening the structure, especially for an aging aircraft, thereby affecting its load carrying capabilities and safe life. This study may be useful for the research and development of industries.
OR-136 EFFECTS OF CRACK CONFIGURATION AND INITIATION IN RESPONSE OF COMPOSITES FOR REMAINING LIFE ASSESSMENT

Sajid Khan, *A. Karim

Department of Mechanical Engineering, Department of Civil Engineering, University of Ontario, 1444-48511

Role of composites are necessary in wide variety of applications ranging from space and aeronautics to current day repair and revitalization of damaged structures. Further composites form the base in the concept of 'smart structures', where the structural or component have an active part in reacting load and consequently improving the performance to rejoined optimum levels. The development of composites begins with the research into fibre-reinforced laminates which has seen a long development before it is possible to tailor a composite as a multi-functional structure. But one of the principal problems in composites is the type of defects that is caused during service and the consequence damage that affects its future performance in the remaining portion of its design life. The presence of cracks and stress concentration effects on composite's response which can be inelastically finding the remaining life characteristics or its strength or its stiffness. Analytical and experimental studies were conducted on composite composites with plan strain failure. The experimental results, even when the basic assumption and material models for studying the behavior of the composite refer to flaws, introduces a directional stiffness, with a potential range of the material in active and passive stages. The composite's ability to influence the stress at the micro level is due to the type of interaction of the carbon fibres and the matrix. The role of matrix crack density is different in active and passive stages are taken and combined with system level to identify how containing the stress affecting the different kinds of damage. Intergranular stress is the effect of remaining life for sometimes due to (a) type of interaction (b) type of tension (c) density of flaws and (d) location of damage. Current work is getting an idea of the remaining life for varied load conditions.

OR-137 FRACTOGRAPHY AND WORK SURFACE ANALYSIS OF Cu-OR ALLOY BASED CAST COMPOSITES

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Dept. of Mechanical Engineering, Indian Institute of Technology, Roorkee, India

A study has been done for the fractured surface of the tensile specimens under the atomic optical and scanning electronic microscopy (SEM) for different cast composites and cast alloys and the results obtained are presented in the present investigation on the Cu-OR alloy based composites. Longitudinal and transverse section view of typical fractured tensile specimens of cast Cu-OR and Cu-Or-Gi alloy composites are observed under stereo-optical microscopy. From the study it is observed that in the specimen, existing around the microstructure of the specimens which is included by the intergranular fracture. The studies have been conducted at an angle between 45° to 60° from the loading axis. The results obtained have been compared with the different fractures obtained from the two generally cast alloy bases of the matrix.

The nature of damage generated during failure in each of the specimen was determined by the Schmitt or graphite method (Cu-OR alloy) and consequent consideration in understanding the mode of failure under gravity load and dry sliding conditions. The present study describes the results of extrusion of wear blocks and also the nature of failure. The results obtained have been compared with other generally cast alloy based composites. The present work is to identify the nature of damage generated during failure in each of the specimen was determined by the Schmitt or graphite method (Cu-OR alloy) and consequent consideration in understanding the mode of failure under gravity load and dry sliding conditions. The present study describes the results of extrusion of wear blocks and also the nature of failure. The results obtained have been compared with other generally cast alloy based composites.

OR-138 TACTILITY INDUCED INFLUENCE ON FRACTURE TOUGHNESS OF PP/HMF NANOCOMPOSITES

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Nanocomposites based on PP/P-MgMnSi and PP/P-TiO2/P-MgMnSi were fabricated via melt mixing in a co-rotating twin-screw extruder at the compounding range of 7:3–5:3 wt% of 'MgMnSi'. Insufficient mixing of MgMnSi lead to insufficient improvement in their stiffness at low loading (10 wt%) accompanied by a reduction in the overall compatibility at the interface. The effect of the interfacial zone (SO) and the angle ∆θ (θ = θ1 - θ2) on the fracture toughness of the nanocomposites was investigated. The SO was found to be the dominant factor affecting the fracture toughness of the nanocomposites.
Remaining Life Assessment of Carbon Fiber Reinforced Composites with Damage

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An attempt to predict the remaining life of the system for different damage parameters like crack initiation, crack location and crack spread and progress and also changes in material behavior near the crack.

E. EXPERIMENTAL STUDIES

4. Materials and Methods

This investigation has been carried out on the unidirectional (0°) carbon fiber reinforced composite (CFRC) manufactured by PVC (Duraco India) with both tough specimens (CFRC-12). The fibers are plain weave with 15/35 ends per inch in both warp and weft direction. The properties of material carbon fiber reinforced composite (CFRC) are given in Table 1.

The composite plates were fabricated in the vacuum bag technique and cured at room temperature for 24h and post-cured at 180°C for 2h. The laminates were cut with right angle of frame having a nominal thickness of 4mm corresponding to the fiber volume fraction of 72% (1). The basic properties of the manufactured composite material are presented in Table 2.

<table>
<thead>
<tr>
<th>Property</th>
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</tr>
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<tbody>
<tr>
<td>Density (g/cm³)</td>
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<td>Modulus of Elasticity (GPa)</td>
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<td>3500</td>
</tr>
<tr>
<td>Torsional Strength (MPa)</td>
<td>2500</td>
</tr>
<tr>
<td>Impact Strength (kJ/m²)</td>
<td>20</td>
</tr>
</tbody>
</table>

Table 1: Mechanical Properties of Manufacturing Composite Materials

The results of the experimental tests were analyzed and compared with the finite element analysis. The finite element analysis was performed using ABAQUS software. The results of the experimental tests were compared with the finite element analysis results to validate the accuracy of the analysis.

The finite element model was created using ABAQUS software and the material properties were assigned to the model. The model was then subjected to various loading conditions to simulate the experimental tests. The results of the finite element analysis were compared with the experimental results to validate the accuracy of the analysis.
Preparation and Characterisation of ZnO-doped amorphous Si solar cell: A new solar cell technology

A. K. Gour, A. K. Jaiswal
Department of Chemistry, National Institute of Technology, Rourkela, India

Abstract

The present work reports the preparation and characterisation of ZnO-doped amorphous Si solar cell. The solar cell was fabricated by the co-evaporation method using RF magnetron sputtering. The solar cell was characterized by electrical, optical, and morphological studies. The results showed that the ZnO-doped amorphous Si solar cell has a higher efficiency compared to the undoped amorphous Si solar cell.
A.1.3 NATIONAL CONFERENCES

Study of Composites with Damage for Remaining Life Assessment

Dulbar Singh, P.K. Bhat, A. Rajaraman and A. Kishorekanta

Hindustan University, Pilani - 333105, Chennai, India.

Abstract

Composites are being used in a variety of applications ranging from aerospace where the usage is growing at an unprecedented rate. Most of these composites are made of other different materials such as plastic or with fiber made up in a composite matrix. The characteristics of materials which can impact the composite are mainly experimental with numerical modeling used to determine the system behavior. In this, study a typical composite with characteristics as given in one of the earlier papers of the work is used to study the damage repair remaining lifetime assessment with damage considered in three types of stresses. The investigation has been carried out on carbon fiber reinforced composites. A.K. Ghosh, B. Singh [1], manufactured by SPC, India, using epoxy with trade name NICOCER-30. The fibers are plain woven with 15 × 15 each at a total weight of 9.5 kg. The composite pieces were damaged in the vacuum bag technique and stored at room temperature for 2160 days and pressurized for 1000 psi for 24 h. The laminate made with eight layers of fabric have a nominal thickness of 1.46 mm corresponding to a fiber volume fraction of 55% (±3%). The basic properties of the fabricated carbon fiber matrix are presented in Table 2. The failure stress and strain are given in Table 2.

Introduction

An aircraft and aerospace vehicles during its service life subjected to severe structural and aerodynamic loads, which may result from repeated loadings and take-off, maneuvering, ground handling and environmental degradation such as weather conditions. These loads can cause damage to the failure of the structure especially for airframe aircraft structures which are made of composites and steel. Strength and stiffness of composite materials are two favorable properties that are used in extensive applications under different kinds of loading. Fatigue is a long-term behavior that involves extended exposure of the component to applied conditions that
Crack Initiation and its Effect on Life Assessment of Composites
Dilber Singh, P.K. Dash, A. Rajaman
Hindustan University, P.O. 622128, Chennai

ABSTRACT:
Composites are being used in a variety of applications ranging from aerospace where the usage is primarily to aeroplane components. Most of these components are made of either different materials with a matrix or with fibres matrix embedded in a composite matrix. The characterizations of natural properties of composites are mostly dependent on analytical modeling used to simulate the system behavior. In this study, a typical composite—carbon fibers reinforced composites—has been characterized in terms of the resin properties, and it is used to simulate the behavior under varying the assessment with damage simulated in the form of cracks. The investigation has been carried out on carbon fiber reinforced composite, DERA, (Ref. A, B), manufactured by ICI, Banca (India) with trade name NACAF-33. The fibres are plain weave with 12-12 ends per inch in both warp and weft direction. The properties of woven carbon fiber fabric are mentioned in Table 1. The epoxy resin used was Araldite LY 556/3D, hardener being Hysol MPR-0512 (product of Dow Chemical Co Ltd, USA), heated at 100°C for 2 h. The laminates made with eight layers of fabric have a nominal thickness of 1.68 mm corresponding to a fiber volume fraction of 55.4 (1 ± 1)%. Tests were conducted to test the basic material properties without damage. Each test was repeated three times and the results are averaged to assess the mechanical and fracture properties. Based on the experimental results with different values of E for the composite termed as E16, E10, E20, E30, analytical studies were carried out using ANSYS to simulate stiffness decay. It is found that the horizontal crack initiation creates more damage causing the remaining life assessment more critical.
Inelastic Behaviour of Damaged Composites in Remaining Life Assessment

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1Mechanical Engineering Department, National Institute of Technology, S(Deemed University), Rourkela, Odisha, India
2Department of Mechanical Engineering, IIT Madras, Chennai, India

Abstract—Composites have become an integral part of many engineering designs. In fact, the current day 'composite structure' concept, where the structure or component takes on a new role in the performance of the aircraft, is entrenched in modern-day aircraft design. The development of composites is an ongoing process that is driven by the need to reduce weight, improve performance, and enhance safety. The introduction of composites in aerospace structures has led to a significant change in the design, manufacture, and maintenance of aircraft. This paper presents an overview of the current state of research on the inelastic behaviour of damaged composites and discusses the challenges and potential solutions to improve the remaining service life of composite structures. The study highlights the importance of understanding the inelastic behaviour of damaged composites and the need for further research to develop advanced composite materials that can withstand service-induced damage and continue to perform efficiently. The results of this study are expected to provide valuable insights for the aerospace industry, enabling the design of safer and more efficient composite structures.
# A.3 TECHNICAL REVIEW

## Technical Review

**Paper Title:** Studies on Crack Configuration and Initiation in Composites for Remaining Life Assessment

**Author:** Dilpreet Singh

**Affiliation:** HINDUSTAN UNIVERSITY (INDIA)

All Reviewers: Please complete your Overall Evaluation below. Check one box per Column Group.

<table>
<thead>
<tr>
<th>Reviewer Badge Number</th>
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### Technical Contribution: Technical Strength

- Excellent – Outstanding Technical Content .................................................. 20
- Good – Solid Work of Notable Importance .................................................. 15
- Acceptable – Valid Work but Limited Contribution ...................................... 10
- Marginal – Simple Contribution with Some Flaws ....................................... 5
- Unacceptable – Questionable Work with Severe Flaws ................................ 0

### Novelty – Advancing Aerospace Technology/State of the Art

- Groundbreaking – Eye Opening ................................................................. 20
- Very Novel Contribution ............................................................... 15
- Some New Concepts ........................................................................... 10
- Little New Here .................................................................................. 5
- Yet Another Paper On ......................................................................... 0

### Relevancy/Timeliness – Topics Relative to Aerospace

- Extremely Relevant to Aerospace Applications .......................................... 20
- Relevant .............................................................................................. 15
- Somewhat Relevant ............................................................................. 10
- Questionable Relevance ......................................................................... 5
- Not Relevant ......................................................................................... 0

### Presentation Quality/Graphics – Organization/Readability

- Well Organized and Well Written ............................................................ 20
- Good Organization and Writing ................................................................. 15
- Could be Improved (see comments) .......................................................... 10
- Needs Quite a Bit of Work ......................................................................... 5
- Unacceptable .......................................................................................... 0

### Accept/Reject (Impossibilities of Science?)

- Conference Best Paper Candidate .......................................................... 80
- Accept .................................................................................................... 20
- Accept if Room for the Paper ................................................................... 20
- Reject (Check this box to Reject Paper) ..................................................... 0

**Total Score per Column per Reviewer (zero if reject)....**

**Total Score:** 70