

# Accepted Manuscript

Photoelastic study on the Effect of Flow Induced Residual Stresses on Fracture Parameters

M. Subramanyam Reddy, K. Ramesh

PII: S0167-8442(16)30032-5

DOI: <http://dx.doi.org/10.1016/j.tafmec.2016.04.003>

Reference: TAFMEC 1702

To appear in: *Theoretical and Applied Fracture Mechanics*

Received Date: 1 February 2016

Revised Date: 8 April 2016

Accepted Date: 10 April 2016

Please cite this article as: M. Subramanyam Reddy, K. Ramesh, Photoelastic study on the Effect of Flow Induced Residual Stresses on Fracture Parameters, *Theoretical and Applied Fracture Mechanics* (2016), doi: <http://dx.doi.org/10.1016/j.tafmec.2016.04.003>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



# Photoelastic study on the Effect of Flow Induced Residual Stresses on Fracture Parameters

Subramanyam Reddy M<sup>a</sup>, Ramesh K<sup>a</sup>

<sup>a</sup>Dept. of Applied Mechanics, IIT Madras,  
Chennai - 600036, India.

Corresponding Author:

**Subramanyam Reddy M**

Dept. of Applied Mechanics, IIT Madras,  
Chennai - 600036, India.

email: subramanyam2604@gmail.com

## ABSTRACT

Flow induced residual stresses, formed during manufacturing, influence the crack initiation and growth process in polymer products. The effect of these residual stresses on mode-I parameters is studied using photoelasticity. Polycarbonate (PC) sheets having only flow induced residual stresses are used for making the single edge notched (SEN) specimen. Residual stresses in the PC sheet are measured using carrier fringe method. Two crack configurations, where residual stress is parallel and perpendicular to the crack axis are considered. The study showed that flow induced residual stress introduces an additional crack tip constraint which depends on the direction and magnitude of the residual stress. A new parameter is defined to quantify the residual stress induced crack tip constraint.

Key words: Flow Induced Residual Stress, Polycarbonate, *T*-stress, Crack Tip Constraint, Photoplasticity

Download English Version:

<https://daneshyari.com/en/article/5019889>

Download Persian Version:

<https://daneshyari.com/article/5019889>

[Daneshyari.com](https://daneshyari.com)