

# **2018 Down to Earth Conference (DTEC 2018)**

**Melbourne, Australia  
27 – 28 November 2018**



**IEEE Catalog Number: CFP1850U-POD  
ISBN: 978-1-7281-0327-3**

**Copyright © 2018 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP1850U-POD
ISBN (Print-On-Demand):	978-1-7281-0327-3
ISBN (Online):	978-1-7281-0326-6

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# TABLE OF CONTENTS

<b>EARTHING DESIGN CHALLENGES AND OPPORTUNITIES FOR UTILITY SCALE SOLAR PV</b> .....	1
<i>Joshua Bowman ; Matthew Bale ; Nui Luekhamhan</i>	
<b>RISK BASED APPROACH TO SUBSTATION EARTHING FOR SA POWER NETWORKS</b> .....	7
<i>Michael A. Brown</i>	
<b>APPLICATION OF SAFETY GUMBOOTS FOR CONSTRUCTION STAFF AS PPE FOR TOUCH VOLTAGE INCIDENTS</b> .....	12
<i>William Bill Carman ; Kevin Hampson ; Don Zeman</i>	
<b>A NOVEL MITIGATION APPROACH FOR LIGHTNING THREAT IN UNDERGROUND MINES WITH GAS DRAINAGE</b> .....	18
<i>Franco D'Alessandro</i>	
<b>DISTRIBUTION EARTHING: STANDARDS, METHODS AND PROCEDURES - A CASE STUDY</b> .....	25
<i>Denan Kurejsepi</i>	
<b>EARTHING AND NEGATIVE RETURN SYSTEMS IN THE MELBOURNE DC RAILWAY</b> .....	34
<i>George Marulli ; Ian Cook</i>	
<b>PROBABILITY OF COINCIDENCE: EXPOSURE TO POWER SYSTEM EARTH FAULTS USING POISSON PATTERNS</b> .....	42
<i>Brent Pawlik ; Ian Griffiths ; Darren Woodhouse</i>	
<b>EFFECT OF SITE GRADING AND EARTHWORK ON SUBSTATION GROUNDING SAFETY</b> .....	49
<i>Eduardo Ramirez-Bettoni</i>	
<b>ADVANTAGES OF PHASOR AND VECTOR ORIENTED TESTING IN SUBSTATION GROUNDING SAFETY</b> .....	55
<i>Eduardo Ramirez-Bettoni</i>	
<b>SYSTEMATIC DESIGN AND COORDINATION OF EARTHING, LIGHTNING PROTECTION &amp; ELECTROLYSIS MITIGATION FOR ELEVATED STRUCTURES SUPPORTING DC RAILWAY</b> .....	62
<i>Jeffrey Russell ; Ulf Kreher</i>	
<b>CONSIDERATIONS WHEN DESIGNING OR ASSESSING SEPARATION BETWEEN TELECOMMUNICATIONS AND POWER SYSTEM ASSETS</b> .....	70
<i>Darren Woodhouse ; Peter Woloszyn ; Glen Barnes</i>	
<b>Author Index</b>	