



# RCM Procedure

ECC RAMS Engineering Procedure: ECC-01-2023-11-PD-001

## APPROVAL

The Procedure preparation, review and approved shall be performed by different professional with proved competencies on RAMS fields. This procedure review take place along the lifecycle whenever it's necessary based on directive, regulation, standards or internal procedure or client requirements.

	Version	Prepared by	Signature	Reviewed by	Approved By	Date
Review	1	Eduardo Calixto				01/01/23
Review						
Review						

## TABLE OF CONTENTS

<b>1 OBJECTIVES, SCOPE &amp; RESPONSIBILITIES</b>	<b>5</b>
<b>1.1 INTRODUCTION &amp; PURPOSE.....</b>	<b>5</b>
1.1.1 General process .....	5
1.1.2 References .....	5
1.1.3 Terms & Definitions .....	5
1.1.4 Acronyms.....	10
<b>1.2 APPLICATION &amp; SCOPE.....</b>	<b>13</b>
<b>1.3 RAM RESPONSIBILITIES.....</b>	<b>13</b>
<b>2 SYSTEM DEFINITION</b>	<b>15</b>
<b>2.1 GENERAL SYSTEM DESCRIPTION.....</b>	<b>15</b>
2.1.1 Rollingstock .....	15
<b>3 RCM METHODOLOGY</b>	<b>17</b>
<b>3.1 SYSTEM HIERARCHY AND SCOPE.....</b>	<b>18</b>
<b>3.2 RISK CONCEPT .....</b>	<b>19</b>
<b>3.3 FAILURE CATEGORY (A, B, C AND D) .....</b>	<b>21</b>
<b>3.4 FAILURE MODES AND CAUSES.....</b>	<b>21</b>
3.4.1 Structure and mechanical parts Failure Modes and Causes .....	22
3.4.2 Electric Parts Failure Modes and Causes.....	25
3.4.3 Electronic parts Failure Modes and Causes.....	26
<b>3.5 RCM PREVENTIVE MAINTENANCE TASKS .....</b>	<b>27</b>
<b>3.6 RCM IMPLEMENTATION .....</b>	<b>29</b>
<b>4 RCM MANAGEMENT</b>	<b>32</b>
<b>5 RCM DEMONSTRATION, VERIFICATION AND VALIDATION</b>	<b>33</b>
<b>6 RCM IMPLEMENTATION STEPS ALONG LIFECYCLE</b>	<b>34</b>
<b>7 RCM SOFTWARE TOOLS</b>	<b>36</b>
<b>APPENDIX A – RCM COMPLETE TEMPLATE</b>	<b>37</b>
<b>APPENDIX B - RCM TEMPLATE (TRACK EXAMPLE)</b>	<b>38</b>
<b>APPENDIX C – RCM TEMPLATE (BRIDGE EXAMPLE)</b>	<b>39</b>
<b>APPENDIX D – MAINTENANCE LCC TEMPLATE – SHADOW OPERATOR</b>	<b>40</b>
<b>APPENDIX E – FAILURE CATEGORIES</b>	<b>41</b>

## **LIST OF TABLES**

Table 1: FMEA risk frequency category.....	19
Table 2: FMEA risk frequency category.....	19
Table 3: FMEA risk frequency category.....	20
Table 4: Risk acceptance criteria.....	20
Table 5: Structures and Mechanical parts failure modes and causes examples.....	22
Table 6: Trackwork System failure modes and causes examples.....	23
Table 7: Local facilities System failure modes and causes examples.....	25
Table 8: Electric Parts Failure mode and causes examples.....	25
Table 9 - Electronic Parts Failure mode and causes examples.....	26
Table 10: RCM template fields description .....	30
Table 11: Maintenance types.....	32

## **LIST OF FIGURES**

Figure 1: RCM Seven steps methodology .....	17
Figure 2: RCM analysis in Life cycle.....	18
Figure 3: Maintenance types.....	28