Standard

D3 – Management of slope geotechnical hazards

July 2015

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<tr>
<th>Group standard</th>
<th>Title: Management of slope geotechnical hazards</th>
<th>Document no: HSEC-B-24</th>
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<tbody>
<tr>
<td>Function:</td>
<td>Health, Safety, Environment and Communities (HSEC)</td>
<td></td>
</tr>
<tr>
<td>No. of pages:</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Approved by ExCo:</td>
<td>August 2015</td>
<td>Effective: January 2016</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No audit before: August 2016</td>
</tr>
<tr>
<td>Owner:</td>
<td>Global head of Health, Safety, Environment and Communities</td>
<td>Approver: Executive Committee</td>
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<td>Target audience: All Rio Tinto Group Businesses</td>
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Direct linkages to other relevant Policies, standard, procedures or guidance notes:

Document purpose:
This standard covers the management of geotechnical hazards associated with natural slopes and temporary or permanent slopes which are excavated or constructed in relation to mining activities or associated supporting infrastructure. It does not cover the design and management of tailings and/or water storage facilities.

Confidential

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D3 – Management of slope geotechnical hazards

Scope and intent

This Safety Standard D3 – Management of slope geotechnical hazards applies to all Rio Tinto projects, business units and managed operations, including new acquisitions. It covers all development phases, from exploration through planning, construction, operation to closure and, where applicable, post closure.

This standard covers the geotechnical hazards associated with both engineered and natural slopes. It does not cover the design and management of tailings and/or water storage facilities.

Engineered slopes are temporary or permanent slopes which are excavated or constructed in relation to mining/business activities or associated supporting infrastructure.

Natural slopes, in this standard, are those formed by natural processes and are sufficiently close to mining/business activities or infrastructure such that they could present a hazard to a business.

The intent of this standard is to provide a framework for the identification and assessment of slope geotechnical hazards, such that they can be managed within our businesses.

The project, business unit or managed operation must comply with prevailing mining law and legislation in the country or state in which it operates, and must comply with relevant mining title license conditions.

Clarification of terminology used in this standard is presented in the Management of slope geotechnical hazards Group procedure.

Control requirements

Requirements in this standard are in addition to those defined in the Rio Tinto management system standard and safety and environment performance standards.

Planning

1.1 Each operation with an engineered or natural slope which could represent a hazard to a business must have a nominated manager accountable for the implementation of this standard and associated Group procedure.

1.2 The nominated manager must arrange for development of a Slope Management Plan (SMP), a Dump Management Plan (DMP) and a Geotechnical Hazard Management Plan (GHMP) as necessary to address identified slope hazards.

1.3 The SMP, DMP and GHMP must document the actions and accountabilities for managing slope geotechnical risks.
1.4 The SMP and DMP must document how engineered slopes are designed and constructed.

1.5 The GHMP must document how natural slope geotechnical hazards are assessed and managed.

1.6 The SMP, DMP and GHMP must document the slope management peer review process.

1.7 The SMP, DMP and GHMP documentation must be reviewed and approved by a Qualified Individual every two years, or more frequently, as determined by risk assessment or significant geotechnical event.

1.8 A Qualified Individual must be responsible for all engineered slope designs and natural slope geotechnical hazard management processes.

1.9 Engineered slope designs and slope geotechnical hazard assessments must be based on adequate geological, geotechnical and hydrogeological data.

1.10 Engineered slope designs must meet, or exceed, specified minimum stability criteria using industry accepted design techniques.

1.11 Engineered slope designs and natural slope geotechnical hazard management processes must be reviewed by a Qualified Individual and/or expert panel at least every two years, or more frequently, as determined by risk assessment or significant geotechnical event.

1.12 Risks associated with engineered and natural slopes must be identified and included in the site HSE risk register.

1.13 Management of change processes must be employed if major changes are made to engineered slope designs, or to natural slope geometries.

**Implementation and operation**

1.14 All engineered slopes must be excavated or constructed using industry accepted techniques and operating procedures.

1.15 Personnel must be trained in slope geotechnical hazard awareness and communication prior to being authorised to access slopes.

1.16 All forms of slope instability must be investigated, addressed and recorded.

**Monitoring**

1.17 Natural slopes must be assessed using industry recognised geotechnical hazard management systems, and outcomes ranked for mitigation.

1.18 Suitably qualified and experienced site representatives must be appointed by the nominated manager to be responsible for slope performance monitoring and conformance measurement.

1.19 A slope performance monitoring process must be developed and implemented.

1.20 A slope conformance measurement process must be developed and implemented for engineered slopes.

1.21 A procedure to verify that slope footprints do not and will not encroach upon permit boundaries must be documented and implemented.

1.22 Engineered slope performance and conformance data must be routinely reconciled against design, and the latter updated as necessary.
### Revision history

<table>
<thead>
<tr>
<th>Version No.</th>
<th>Effective Date</th>
<th>Prepared by</th>
<th>Reviewed by</th>
<th>Authorised by</th>
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<tbody>
<tr>
<td>1</td>
<td>January 2012</td>
<td>Martyn Robotham</td>
<td>BU &amp; T&amp;I geotechnical practitioners</td>
<td>Suresh Rajapakse</td>
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<th>Revision number</th>
<th>Revision date</th>
<th>Revised by</th>
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<th>Reason for change</th>
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<tr>
<td>2</td>
<td>July 2015</td>
<td>Martyn Robotham</td>
<td>BU &amp; T&amp;I geotechnical practitioners</td>
<td>ExCo</td>
<td>Update to address issues identified by RTKC Manefay failure investigation and to add consideration of natural slope hazards following IOC rail slope failure.</td>
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