WHAT ANEPAC IS AND DOES

ANEPAC represents nationally regional and states associations of sand and crushed stone producers.

ANEPAC actions are financially supported by these associations and by voluntary contribution of major aggregates producers.

ANEPAC acts for assuring aggregates industry interests in Congress, in states legislative houses, in offices that enforces mining, environment, safety & health, labor laws and regulations.

ANEPAC edits a magazine (Areia & Brita)
## Brazil in Figures

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (million)</td>
<td>174.1</td>
<td>186.8</td>
<td>193.3</td>
</tr>
<tr>
<td>Population Growth Rate</td>
<td>1.5</td>
<td>1.4</td>
<td>1.2</td>
</tr>
<tr>
<td>Gross Domestic Product (US$ billion)</td>
<td>644.5</td>
<td>882.5</td>
<td>1,654</td>
</tr>
<tr>
<td>Evolution of Gross Domestic Product</td>
<td>4.3</td>
<td>2.9</td>
<td>5.1</td>
</tr>
<tr>
<td>Inflation Rate</td>
<td>6.2</td>
<td>7.5</td>
<td>4.5&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Cement Consumption (million metric tons)</td>
<td>39.7</td>
<td>37.7</td>
<td>55</td>
</tr>
<tr>
<td>Concrete Consumption (million m³)</td>
<td>50.9</td>
<td>48.3</td>
<td>70.5</td>
</tr>
<tr>
<td>Aggregates Consumption (million metric tons)</td>
<td>257</td>
<td>331</td>
<td>493&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Source: IBGE, DNPM, Anepac

<sup>1</sup> Anepac

<sup>2</sup> Brazilian Central Bank

Area: 8.5 million km²
# 2009 Quick Summary of the Brazilian Aggregates Industry

<table>
<thead>
<tr>
<th></th>
<th>Sand</th>
<th>Crushed Stone</th>
<th>Aggregates</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Production (t.10^6)</strong></td>
<td>289</td>
<td>192</td>
<td>481</td>
</tr>
<tr>
<td><strong>Per Capita</strong></td>
<td>1.5</td>
<td>1.0</td>
<td>2.5</td>
</tr>
<tr>
<td><strong>Operations</strong></td>
<td>2,500</td>
<td>600</td>
<td>3,100</td>
</tr>
<tr>
<td><strong>Distribution (tpm)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60%: 1,500 – 10,000</td>
<td>60%&lt;20,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>35%: 10,000 – 25,000</td>
<td>30%: 20,000 – 40,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5% &gt;25,000</td>
<td>10%&gt;40,000</td>
<td></td>
</tr>
<tr>
<td><strong>Employees</strong></td>
<td>47,000</td>
<td>21,000</td>
<td>68,000</td>
</tr>
<tr>
<td><strong>Total Revenue^1 (US$ bilhão)</strong></td>
<td>2.22</td>
<td>2.38</td>
<td>4.60</td>
</tr>
</tbody>
</table>

Source: Anepac

^1 Total value of material f.o.b. plant
Brazilian Aggregates Production by Region 2009

<table>
<thead>
<tr>
<th>Region</th>
<th>Quantity (million metric tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northeast</td>
<td>266.2</td>
</tr>
<tr>
<td>Southeast</td>
<td>27.0 (5.6%)</td>
</tr>
<tr>
<td>Central West</td>
<td>82.4 (17.2%)</td>
</tr>
<tr>
<td>North</td>
<td>55.4 (11.5%)</td>
</tr>
<tr>
<td>South</td>
<td>49.4 (10.3%)</td>
</tr>
</tbody>
</table>

Source: Anepac
## 2009 Aggregates Market Segmentation

<table>
<thead>
<tr>
<th>Stone (%)</th>
<th>Segment</th>
<th>Sand (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>Ready Mixed Concrete</td>
<td>20</td>
</tr>
<tr>
<td>24</td>
<td>Construction Companies</td>
<td>15</td>
</tr>
<tr>
<td>14</td>
<td>Prefabricated industries</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td>Sellers/Shops</td>
<td>10</td>
</tr>
<tr>
<td>9</td>
<td>Asphalt plants</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>Government</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Others</td>
<td>2</td>
</tr>
<tr>
<td>___</td>
<td>Mortars</td>
<td>35</td>
</tr>
</tbody>
</table>

Source: Anepac
Brazilian Aggregates Production Forecast
(Million Metric Tons)
Demand Outlook (1997 – 2015)

- **Growth Consumption**
  - 2007: aggregates production reached 390 Mt;
  - 2008: 19% growth;
  - 2009: 3.4% growth;
  - 2010: projected a 5% growth;
  - Over the next 5 years: projected an average annual growth rate of 6%.

- **Production Capacity**
  - 1998 up to 2004: decrease due to lack of investment;
  - 2005 up to 2007: investments on new equipments and new plants;
  - 2008: production capacity estimated at 520 Mt;
  - 2009: production (481 Mt) achieved 92% of the production capacity.

- If
ANEPAC has not its own OH&S program.

IBRAM (Brazilian Mining Institute) represents the mining industry and has as its associates mining companies and mineral producers associations as ANEPAC.

MINER AÇÃO – It is the name IBRAM adopted for Occupational Health & Safety program. Mineração is mining in Portuguese; Ação is action in Portuguese.

The program is being structured by IBRAM and the following slides is being presented at events by IBRAM’s staff.
NOTES

INSS – National Institute of Social Security – It pays retirement pensions; it also pays a salary to workers who have accidents or diseases and cannot work for a period of time (first 15 days – company; more than 15 days – insurance); workers should be examined by an official physician; than it also collects data on accidents at the work place and occupational diseases and publishes statistics annually.

MTE – Ministry of Labor – it enforces legislation about labor.

ABNT – Brazilian Technical Standards Association – sets standards

NBR – Brazilian Standard
OIT – International Labor Organization
DNPM – National Department of Mineral Production – it enforces the Mining Law; collects statistics of the mining industry
FAP (Accident Prevention Factor) – This factor verifies the performance of a company within their economic activity for accidents occurring in a given period. The FAP is a multiplier that varies from 0.5000 to 2.0000.
SAT/RAT – It is a contribution (tax) paid by a company to finance insurance paid to workers that cannot work due to an accident and consists of percentage that measures the risk of the economic activity. SAT/RAT: 1% (minimal risk); 2% (medium risk) and 3% (serious risk). It is applied over the total amount of wages and salaries paid by the company in a month.
SAT – Working Accidents Insurance
RAT – Working Environment Risk
Managing risks is looking to the future...
ACCIDENTS IN MINING - BRAZIL

Social Security Statistical Yearbook

* NTEP / INSS
OCCUPATIONAL DISEASES IN MINING - BRASIL

Social Security Statistical Yearbook

* NTEP / INSS
## FATALITY RATE BY MINERAL CLASS – BRAZIL / 2006 - 2008

<table>
<thead>
<tr>
<th>MINERAL CLASS</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stone, Sand &amp; Gravel, Clay</td>
<td>42.92</td>
<td>50.61</td>
<td>45.18</td>
</tr>
<tr>
<td>Other Non-ferrous Minerals</td>
<td>47.10</td>
<td>12.58</td>
<td>24.26</td>
</tr>
<tr>
<td>Precious Metals</td>
<td>13.80</td>
<td>22.87</td>
<td>40.21</td>
</tr>
<tr>
<td>Alluminium</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Iron</td>
<td>11.90</td>
<td>10.71</td>
<td>12.93</td>
</tr>
<tr>
<td>Coal</td>
<td>0.00</td>
<td>0.00</td>
<td>3.00</td>
</tr>
</tbody>
</table>
FATALITY RATE BY COUNTRY / 2006


ACCIDENTS – HOW MUCH THEY COST

DIRECT COSTS: medical expenses, days lost, fines, ...

INDIRECT COSTS □ High

- loss of materials
- loss of equipments
- loss of production
- loss of market share
- IMAGE – loss of prestige
- higher insurance premium
- criminal/civil suit expenses, payments to lawyers
GOVERNAMENTAL ACTIONS

- Mineral Production Department-DNPM/Ministry of Labor-MTE:
  - NRM-22  Workers Protection Rules.
  - NR-22  Risk Management Program

- Social Security Institute-INSS / MTE Partnership:
  - SIRENA PROJECT - MTE  Regressive Actions - INSS

- Labor Public Prosecutor’s Office:
  - Makes companies, associations, etc. sign agreements to achieve goals

- National Institute for Social Security - INSS:
  - FAP = 0.5% a 6%  SAT - RAT = 1%, 2%, 3%
  - FAP (Accident Prevention Factor)
  - SAT – Working Accidents Insurance
  - RAT – Working Environment Risk
PROGRAM MINERAÇÃO - WHY?

- Develop preventive management and culture in mining companies;
- Use advanced technological resources on Occupational Safety and Health issues;
- Keep track of new legal regulations and enforcement policy by OSH offices;
- Disseminate and share information on Good Practices;
- Build mining industry’s Database and Statistics on OSH;
- Demonstrate commitment to social responsibility and sustainable development;
- Get for the mining industry a better image on OSH issues.
GOAL

“Being seen as the Industry which gets the Best Results on Occupational Safety and Health in Brazil”.
TEN PRINCIPLES OF THE PROGRAM

First Principle: Act permanently in order to minimize risks to health and safety of persons working in mining activities.
Second principle: Make known, in all the hierarchical levels, that safe behavior depends on the commitment of everybody.
Third principle: Encourage mining companies, regardless of its size and management systems, to participate voluntarily in the program.
The fourth principle: Unrestricted support of the Brazilian OS&H legislation and commitment to the principles of ICMM-International Council of Mining and Metals in regard to occupational safety and health.
Fifth Principle: Emphasize that safety and healthy working environment should be present at all stages of the project.
TEN PRINCIPLES OF THE PROGRAM

Sixth principle: Promote broad, constant and continuous exchange of experiences and good practices across the mining industry (and stakeholders), using appropriate means of communication.

Seventh principle: Encourage the development of people (employees, contractors, partners and stakeholders) through education and training.

Eighth principle: Verify and measure performance and improvement, build database of mining industry indicators and disseminate them.

Ninth principle: Encourage the development of management and culture in occupational health and safety and improve facilities and equipment for safety and health of persons.

Tenth Principle: Promote the continuous improvement of occupational safety and health.
STRUCTURE of MINERAÇÃO

- CONTENTS: topics chosen by mining companies – GTT (Working Party)

GTT 01 – Legislation systematic monitoring of bills on OH&S issues in Congress and Senate

GTT 02 – Risk Management/Culture Program on OH&S

GTT 03 – Emergency Procedures / Investigation and Analysis of Accidents in Mining

GTT 04 – Critical Issues: Working at Height, Electricity, Vehicle Use (Traffic/Transportation), Confined Spaces, Explosives, Wall/Bench/Roof Stability, Underground works.

GTT 05 – Hygiene and Occupational Health

GTT 06 – Contractors Management
WHAT EACH GROUP IS DOING

- **GTT 01 – Legislation**

What is ready:
- monitoring bills on OS&H issues in Congress and Senate and communication of their progress
- legal information database/Glossary
- website IBRAM-restricted area
• **GTT 02 – Risk Management/Culture Program / OH&S**

What is ready:
- Flowchart - risk management system
- Risk Inventory– Risk Matrix
- Risk analysis
- Risk Evaluation
- Terminology and definitions of risk management/OH&S.

In Development:
- Risk management: developing final checklist.
GTT 03 – *Emergency Procedures / Investigation and Analysis of Accidents in Mining*

What is ready/done:
- "Preparation and Response to emergencies"- Protocol and checklist.
  - “Investigation and Analysis of Accidents"- Protocol and checklist.

- Technical visits:
  AngloGoldAshanti-MG (gold)
  Sama-GO (asbestos)
  Mineração Santiago-MG (gneiss);
• **GTT 04 – Critical Issues**

What is ready:
“Working at Height”- Protocol and checklist.
“Electricity”-Protocol and checklist.
“Vehicle Use (traffic/transport) ”- Protocol and checklist.
"Confined spaces": Protocol

In Development:
"Confined spaces": checklist
“Explosives”: Protocol and checklist.

Pending:
Stability
Protection of machinery and equipment
Handling and lifting /transport of materials
Underground works
GTT 05 – Hygiene and Occupational Health

What is ready:
“Risk management in occupational health and hygiene”- Protocol and checklist.
"PCMSO"- Protocol and checklist
● **GTT 06 – Contractors Management**

What is ready:
“Contractors Management”: Protocol and checklist

Pending:
formatting and revision
## STRUCTURE OF MINERAÇÃO

- **Evaluation System:**
  - short term: self evaluation – questionnaire of survey
  - long term: external evaluation

- **CLASS OF COMPANIES:**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level 1</strong></td>
<td>Beginner</td>
</tr>
<tr>
<td><strong>Level 2</strong></td>
<td>Intermediate</td>
</tr>
<tr>
<td><strong>Level 3</strong></td>
<td>Advanced</td>
</tr>
<tr>
<td><strong>Level 4</strong></td>
<td>Excelency</td>
</tr>
</tbody>
</table>
PERFORMANCE INDICATORS

Adopt usual indicators – INSS - ABNT/NBR 14.280:

**frequency rate:** \( N \times \frac{1,000,000}{H} \)  
- \( N \) = men injured in period;  
- \( H \) = man-hours of exposure to risks

**severity rate:** \( T \times \frac{1,000,000}{H} \)  
- \( T \) = total time (days lost); \( H \) = man-hours of exposure to risk

**Fatality rate:** total of deaths \( \times \frac{100,000}{\text{total of job in the industry}} \)
IBRAM ACTIONS - COMUNICATION

website: www.ibram.org.br/MINERAÇÃO

HEADLINES

- What is MINER AÇÃO?
- Documents
- Agenda – informations
- Partners
- Transcripts of Seminars and Lectures
- Accidents Indicators
- Form to adhering to the Program
- Supporting companies
- Access to restricted areas
Restricted Area

- Registration – preliminary assessment - Database
- Chat
- GTT:
  - Meeting Minutes
- Legislation (IUS Natura)
- Meeting Calendar
- General Meetings
Database: OCCUPATIONAL ACCIDENTS DATA Software

- Access to supporters
- Access to supporters: how to fill the forms

MINERAÇÃO
Programa Especial de Segurança e Saúde Ocupacional na Mineração

INSTRUÇÕES INICIAIS

CADASTRO

Utilize a opção "Alterar Dados" em Cadastro, no menu lateral, para modificar as informações da empresa cadastrada e inclusive mudar o e-mail e senha de acesso.

QUESTIONÁRIO

Para responder os questionários, clique sobre o respectivo ano no menu lateral e siga as instruções de preenchimento.

Os anos com o ícone ! ao lado são novos questionários e tem nenhuma questão respondida.

Os anos com o ícone Ñ ao lado já foram respondidos parcialmente ou totalmente, mas ainda não foram enviados.

Os anos já respondidos e enviados terão o ícone ✔ ao lado. Questionários enviado podem ser consultados, mas não podem ser alterados.
- Access to supporters: how to fill the questionnaires
- Access **IBRAM Data Management**: 
  - restricted access: IBRAM
  - create / change questionnaire
  - companies data reception

- produce graphical / numerical reports:
  - various screenshots of data management interfaces and reports.
Communication Network
Newspaper – Indústria da Mineração

Edição Setembro/08

Edição Nov. e Dez./08

Edição Jan. e Fev./09

Edição Outubro/08

Artigo

Edição Março /2010

BMK: Empresa com melhor desempenho
V-Data e V-Meeting

Audio-meeting System

Documents in the web System
Miscellaneous

- Visual identity - Logo

- Graphic project - folder

Newsletter;
WHAT WILL BE DONE

- **Medium Term: 2011-2013** - Training: Leaders and Technicians · INVESTIMENTS

  Partnership POLI/USP · big companies
  POLI – USP – São Paulo University Faculty of Engineering

  Partnership SESI · small/medium companies

  Homemade solutions · in some cases

  - Contact: Government, Universities, others
  - Self-assessment · Dec. 2011
  - Congress “MINER AÇÃO” · Dec. 2012
  - GESST – Strategic Group in Occupational Safety & Health

- **Long Term: > 2015** - External Assessment / production chain integration.
What we want

Greater consistency of risk assessment methodologies
Improve accident rates
Improve relationship: confidence of workers, training, motivation
Improve public IMAGE
Bring GOOD PRACTICES in occupational Health & Safety to the mining companies
Show how important is Occupational Health & Safety theme for the mining industry
COME TO MINERAÇÃO

- Voluntarily
- Companies associated or not to IBRAM
- Small and Medium Companies  low cost
- Registration  commitment
THANK YOU

www.anepac.org.br
www.ibram.org.br