

The logo for the Society of Mining Engineers (SME) features the letters 'SME' in a bold, blue, sans-serif font. A yellow and green curved line sweeps under the letters from the left side.

**WFEO**  
**Committee on Engineering**  
**and the Environment**

**Task Force on Sustainability and Mining**  
**Nikhil Trivedi, Ph.D. - Chair**

**Milos, Greece**  
**July 2013**

- Who are we? Where do we fit in?
- A few words about our landscape
- Our members and our structure
- Our Goals and Objectives
- What have we done so far
- Our future plan
- What do we see as our key opportunities?

The logo for SME (Society of Manufacturing Engineers) features the letters 'SME' in a bold, blue, sans-serif font. A yellow and green swoosh underline is positioned beneath the letters, starting from the left and curving under the 'S' and 'M'.

# Who are we?

- AAES: American Association of Engineering Societies is a National member of the WFEO.

## Who are we?

- AAES : American Association of Engineering Societies is a National member of WFEO.
- AIME : American Institute of Mining, Metallurgical and Petroleum Engineers is an active member of AAES.
  - Founded in 1871, founder engineering society
  - Four member societies, 150,000 members

## Who are we?

- AAES : American Association of Engineering Societies is a National member of WFEO
- AIME : American Institute of Mining, Metallurgical and Petroleum Engineers is an active member of AAES
- SME : Society for Mining, Metallurgy and Exploration is a member society of AIME

**SME**

The logo consists of the letters 'SME' in a bold, blue, sans-serif font. A yellow swoosh underline starts under the 'S', curves under the 'M', and ends under the 'E'.

# Our Landscape



# SME

## Our Landscape

- What cannot be grown must be mined
- Haunted by past industry practices
- Essential for society's advancement and economic development - necessary evil

- Capital intensive, technology intensive, energy intensive
- Broad spectrum of locations
  - Remote, challenging terrains (metal, coal, indust. min.)
  - Close to urban areas/markets (aggregates)
- Broad spectrum of sizes
  - Giant multinationals
  - Family owned to regional operations



- Mining is everywhere, in every nation, on every populated continent
- Mining is the backbone of a vibrant industrial economy
- It is a perfect challenge for engineers

- Conflict Minerals
- Illegal Mining
- Value Derived from Mining
- Nationalism



**SME**

# Our Task Group

- In November 2011, Darrell Danyluk contacted SME and suggested that we join forces with WFEO and the CEE to address sustainability and mining.
- In February 2012, our strategic plan was accepted by the Chair of CEE.
- In the April 2012 newsletter of CEE, this topic and our task group activities were featured.

- Core group from SME serve central steering functions of TF
  - Nikhil Trivedi, Chair - engineer with industry perspective
  - Dr. Deborah Shields, Colorado State University – an educator who provides SD contacts worldwide
  - Carol Russell, U.S. Environmental Protection Agency – regulator's perspective
  - John Hayden, SME staff liaison

- Task group members are at-large
- Nations with economies tied to mining
  - Balance between developed and developing economies
  - Balance between academia and operational engineers
- Fluid group, flexible
  - Open to new representatives from task force countries
  - Open to new countries joining task force

# SME

# Africa



3 members from Ghana



1 member from Zambia



1 member from South Africa

# SME

## Asia



1 member from India

1 member from China



1 member from Turkey





- 1 member from Queensland
- 1 member from New South Wales



- 1 member from Spain
- 1 member from Germany
- 1 member from Slovenia
- 2 members from Greece, and
- 2 members from Finland



- 1 member from Canada
- 4 members from the U.S.

## South America



- 1 member from Chile



# Task Group Membership

- Australia (2)
- Canada
- Chile
- China
- Finland (2)
- Germany
- Ghana (3)
- Greece (2)
- India
- Slovenia
- South Africa
- Spain
- Turkey
- United States (4)
- Zambia

- We have a community bulletin board on the SME website .... [www.smenet.org](http://www.smenet.org)
- International telephone calls with TG members
  - Time zone challenges
  - Connectivity challenges

# SME

The logo for SME features the letters 'SME' in a bold, blue, sans-serif font. A yellow swoosh underline starts under the 'S' and curves under the 'M' and 'E'.

## Our Goals and Objectives



SME

# Our Over-Arching Goal

**Capacity building** for mineral producers, and stakeholders, including authorities, non-governmental organizations, and the general public.





# SME

## Mission/Purpose

To raise global understanding and application of engineering approaches and technologies so as to increase the contributions of the mining and minerals industries to economic, social and environmental wellbeing, and sustainable development.



# Objectives/Goals

- To advocate for an engineering perspective regarding minerals issues internationally and in the UN.
- To share information on culturally appropriate technologies in developing nations and among small to medium enterprises and artisanal miners.
- To identify geographic and sectoral areas of greatest need for capacity building on engineering practices and technologies within the minerals sector, and among affected stakeholders, including authorities, civil society, and non-governmental organizations.

# Objectives/Goals

- To increase understanding of existing and new engineering practices and technologies and their appropriate application in the minerals industry.
- To advocate for the use of best engineering practices to increase worker and affected community health and safety, to minimize environmental impacts, and to increase eco-efficiency.

## Objectives/Goals

- To share engineering perspectives and approaches regarding reuse, repurposing, and recycling of mineral materials.
- To promote the application of risk assessment, mitigation and management within the minerals sector.

# SME



STATUS



**SME**

Status (cont.)

**Five Thematic Concentration Areas**

- Environmentally sound engineering practices and technologies
  - Co-chairs: Dirk Van Zyl (CA)/Mutale Chanda (ZM)

- Best practices in social sustainability and responsibility including worker health, safety, reliability and training
  - Co-chairs: Zach Agioutantis(GR)/Jose Botin(ES/CL)



- Best practices in eco-efficient use of land, water, energy, and mineral resources
  - Chair: Chris Moran (AU)

- Engineering solutions to reuse, recycle and repurpose mineral materials
  - Co-chairs: Ilkka Kojo(FI)/Mutale Chanda(ZM)

- Risk analysis, mitigation and management techniques
  - Co-chairs: Zhongxue Li(CN)/Burhan Sahin(TR)

The logo for SME (Society of Manufacturing Engineers) features the letters 'SME' in a bold, blue, sans-serif font. A yellow and green curved line sweeps under the letters from left to right.

**SME**

Status (cont.)

Six Fundamental Principles of Engineering

# Six Fundamental Principles of Engineering

1. Engineers are analytical. The tools of mathematics are relevant and necessary in the big challenges of measuring sustainability. There are no free rides in the world of cause and effect. Informal and sloppy linking (or non-linking) is unacceptable.

### Six Fundamental Principles of Engineering

1. Engineers are analytical. The tools of mathematics are relevant and necessary in the big challenges of measuring sustainability. There are no free rides in the world of cause and effect. Informal and sloppy linking (or non-linking) is unacceptable.
2. Engineers are pragmatic. Engineers look up to science in order to bring new design concepts into play, and if theories are not still satisfactory, bridges must be built.

### Six Fundamental Principles of Engineering

1. Engineers are analytical. The tools of mathematics are relevant and necessary in the big challenges of measuring sustainability. There are no free rides in the world of cause and effect. Informal and sloppy linking (or non-linking) is unacceptable.
2. Engineers are pragmatic. Engineers look up to science in order to bring new design concepts into play, and if theories are not still satisfactory, bridges must be built.
3. Engineers are always open to innovation. However, in a production process such innovations have to be brought with the necessary caution to not disrupt production.

## Six Fundamental Principles of Engineering

1. Engineers are analytical. The tools of mathematics are relevant and necessary in the big challenges of measuring sustainability. There are no free rides in the world of cause and effect. Informal and sloppy linking (or non-linking) is unacceptable.
2. Engineers are pragmatic. Engineers look up to science in order to bring new design concepts into play, and if theories are not still satisfactory, bridges must be built.
3. Engineers are always open to innovation. However, in a production process such innovations have to be brought with the necessary caution to not disrupt production.
4. Engineers must understand and apply discipline fundamentals. Bridges must not fall down!



## Six Fundamental Principles of Engineering

1. Engineers are analytical. The tools of mathematics are relevant and necessary in the big challenges of measuring sustainability. There are no free rides in the world of cause and effect. Informal and sloppy linking (or non-linking) is unacceptable.
2. Engineers are pragmatic. Engineers look up to science in order to bring new design concepts into play, and if theories are not still satisfactory, bridges must be built.
3. Engineers are always open to innovation. However, in a production process such innovations have to be brought with the necessary caution to not disrupt production.
4. Engineers must understand and apply discipline fundamentals. Bridges must not fall down!
5. Engineers understand that good design results in good outcomes.

### Six Fundamental Principles of Engineering

1. Engineers are analytical. The tools of mathematics are relevant and necessary in the big challenges of measuring sustainability. There are no free rides in the world of cause and effect. Informal and sloppy linking (or non-linking) is unacceptable.
2. Engineers are pragmatic. Engineers look up to science in order to bring new design concepts into play, and if theories are not still satisfactory, bridges must be built.
3. Engineers are always open to innovation. However, in a production process such innovations have to be brought with the necessary caution to not disrupt production.
4. Engineers must understand and apply discipline fundamentals. Bridges must not fall down!
5. Engineers understand that good design results in good outcomes.
6. Effective engineers respect other disciplines (both within and external to engineering).



# SME

## Our Scope

- Small to Medium Mining Enterprises
- Africa / Asia
- Collaboration with existing initiatives

# SME

The logo for SME features the letters 'SME' in a bold, blue, sans-serif font. A yellow swoosh underline starts under the 'S', curves under the 'M', and ends under the 'E'.

**Our Work Product**

- Dissemination of information on the role of minerals and metals in sustainable development, including the role of minerals in improving the quality of life, and
- Promotion of the achievements and capabilities of the minerals community to the general public and specifically to the communities in which mineral companies operate.

- Resource library on WFEO website?
- Guideline booklets?
  - For operators
  - For stakeholders/public
  - For regulators
  - In multiple languages
- Checklists for target groups?
- All of the above?



# SME

# Opportunities

- Target our work product based on the audience
- Involve young engineers
- Communicate clearly and in multiple languages
- Remain faithful to **ENGINEERING**



# Collaboration with WFEO Committees

- Capacity Building
- Disaster Risk Management
- Education
- Innovative Technologies
- Energy
- Anti-Corruption
- Future Leaders





# SME

# Collaboration Opportunities

- UNESCO
  - Asia
  - Africa

- Rio + 20 – June 20-22, 2012
  - CETEM: Rare Earths and Social Impacts
  - Vale: Mining and Sustainable Development
- Mining on Top: Africa Summit – London - June 25-26, 2013
- Sustainable Development in the Minerals Industry (SDIMI) – Milos, Greece - June 30-July 3, 2013
- WFEO Annual Meeting – Singapore - Sept 11-13, 2013



# Sustainability and Mining

My objective for today's sessions:

Interaction – hear us and share your thoughts with us

Join the TF



# Contacts

Dr. Nikhil Trivedi ([nikhiltrivedi@idekin.com](mailto:nikhiltrivedi@idekin.com))

+1-610-250-1913

John Hayden ([hayden@smenet.org](mailto:hayden@smenet.org))

+1-303-948-4250

Thank you!

# SME

If it can't be grown...



# SME

...it has to be mined!

