

# GEOMECHANICS INITIATIVE

A network managed by **otm**

## Pre-Launch Discussion Meeting

Subsurface & Wells Practice, 17<sup>th</sup> May 2017



# Meeting agenda – Wednesday 17<sup>th</sup> May 2017

<b>Wednesday, 17 May 2017</b>			
<i>Arrival with tea/ coffee</i>			09:30
1	Welcome and introduction to Geomechanics Initiative	Francesca Tate, OTM	10:00
2	Signal Processing Opens Way to Geomechanics	DONG	10:30
3	<i>Shell Experiences and Challenges with Geomechanics</i>	Shell	11:20
<i>Lunch at venue</i>			12:10
4	<i>Nexen Experiences and Challenges with Geomechanics</i>	Nexen	13:10
5	<i>Discussion on Experiences and Challenges with Geomechanics</i>	ConocoPhillips, Maersk, ENI, OMV	13:40
<i>Tea/ Coffee</i>			14:40
6	<i>Facilitated discussion sessions, thoughts and next steps</i>	<i>Led by OTM</i>	15:00
7	Meeting wrap up	Francesca Tate, OTM	15:50
<i>End of day</i>			16:00

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# Roundtable introductions

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# Background and drivers

# Background

OTM first approached GMN members and those outside of the GMN, whose responses showed that there was a need for such a network

*I do agree that there is a need for such a network, but it very much depends on the objectives assigned to such network*

*I agree that there is a need for a network looking at the geomechanical aspects of PWRI*

*...peer feedback is easy amongst friends and colleagues but IP is not discussed openly as it is commercially sensitive and not shared...*

*...there are far too many private clubs who only open the doors after a safety or an environmental issue. If people are sincere about safety the IP lack of trust needs to stop*

Key geomechanical challenges include:

- Pore pressure prediction
- Wellbore stability
- Sand prediction
- Fracture analysis
- Fault seal analysis
- Compaction and subsistence

There is a growing interest in shale gas and other unconventional hydrocarbon sources, and as a result there is an increasing demand for geomechanical knowledge, especially in hydraulic fracturing modelling and optimisation

# Background

OTM would like to create a network for 'geomechanics education and sharing', to meet the needs of the industry

The primary aim would be for members to:

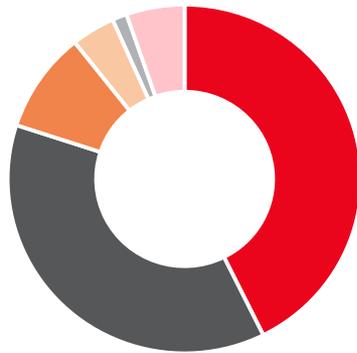
- Exchange knowledge and information
- Peer feedback/ validation and review work
- Provide perspective on different/ common problems faced
- Gain insight into issues relating to current assets and R+D

To validate the need for such an initiative, OTM conducted an industry survey to identify:

- Is this a genuine gap in industry?
- Which companies would this be relevant to?
- What might be covered in this network?

# Survey responses

Type of Company



■ Service Company    ■ Operator  
 ■ Consultancy        ■ Academic  
 ■ Technology Provider   ■ Other

Discipline



■ Geomechanics        ■ Petrophysics  
 ■ Geology              ■ Reservoir Engineer  
 ■ Production Engineer   ■ Geophysics  
 ■ Other

Geography

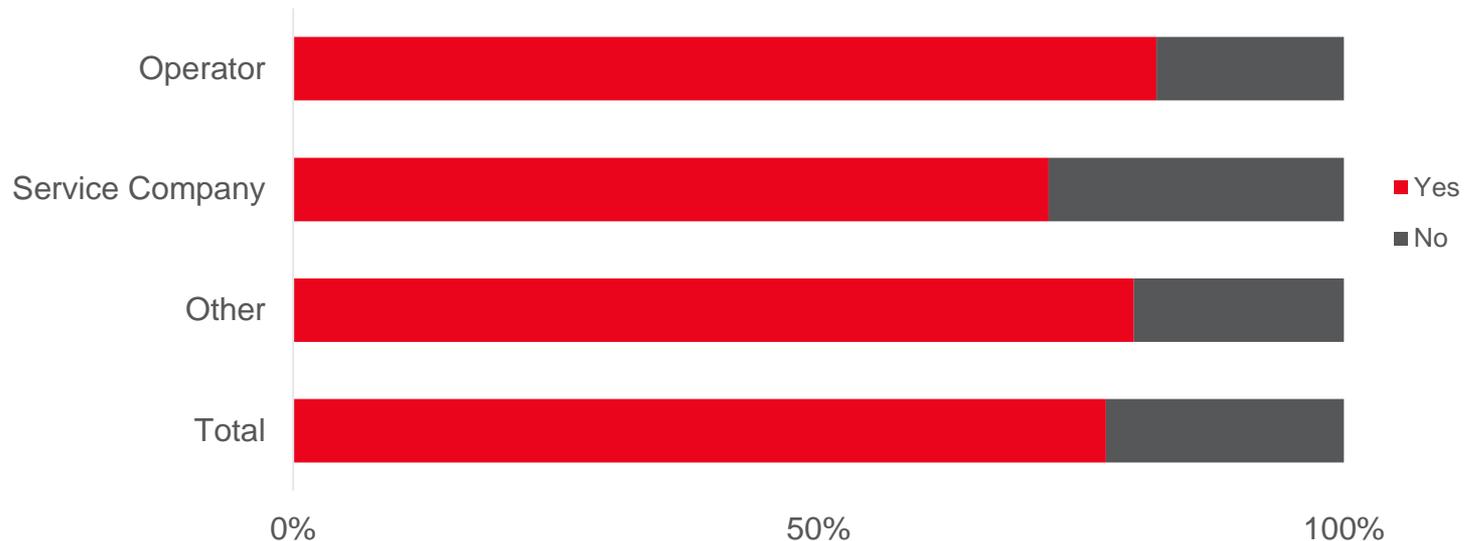


■ Europe                ■ North America  
 ■ South America      ■ Middle East  
 ■ Asia

- The survey generated over 80 responses from a range of companies, technical backgrounds and geographies (75 of the respondents agreed to share their response)
- Of those agreeing to share their response, 28 representatives were from the operators and 32 were from service companies
- The survey was sent to a wide range of disciplines including geoscience, petrophysics and engineering; the majority of responses were from people with geomechanics backgrounds
- There was a global spread of participants, however Europe and North America dominated the responses

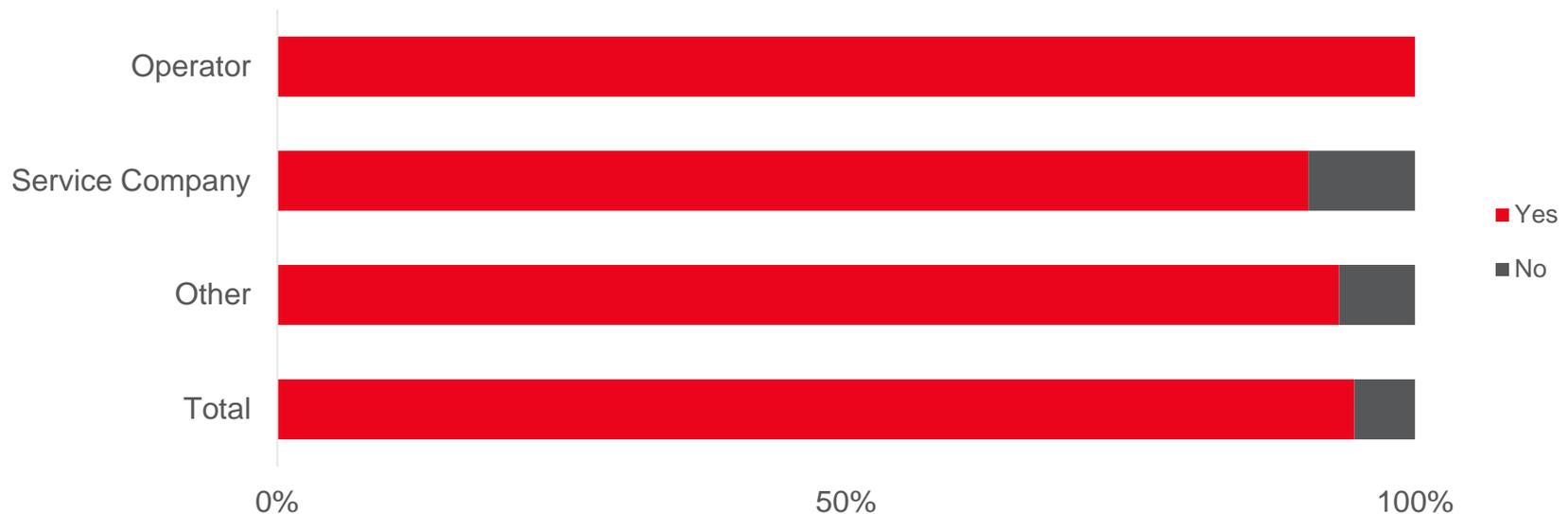
## Is geomechanics a priority to your company?

- 77% of participants felt that geomechanics was important to their company, agreeing that it is a priority area
- Of the respondents 82% of operator and 72% of service company representatives stated that geomechanics was a priority area



# Do you think there may be widespread adoption of geomechanics as industry moves to more complicated fields and reservoirs?

- The overwhelming majority of participants replied saying that they felt there would be more widespread adoption of geomechanics as the industry moves to more complex reservoirs
- All of the operator representatives believed that this would be the case



# What do you think the future of geomechanics might include?

## More applications

Routine coupling with reservoir simulation, frequent measurement of stresses across a field, tie-up with 4D seismic surveys

Best practices to avoid induced seismicity

Coupling stress / pore pressure / chemical and thermal processes & hydraulic fracturing in fractured reservoir

A more detailed view of formation damage problems and modelling to overcome some new features of instability in well bore environment.

Better sand production prediction. Improved pore pressure prediction models involving seismic processing while drilling

Inclusion of more complex modelling for fracture optimisation including VTI stress models for better performance placement and higher accuracy of stress estimation

## New ways of working

More efficient workflows, better adoption of technologies, sharing of ideas and data

Geomechanics being done less by experienced specialists, and instead by a broader range of professionals.

Software that allows modelling and visualised 4D deformation behaviour especially during drilling, hydraulic fracturing and sanding

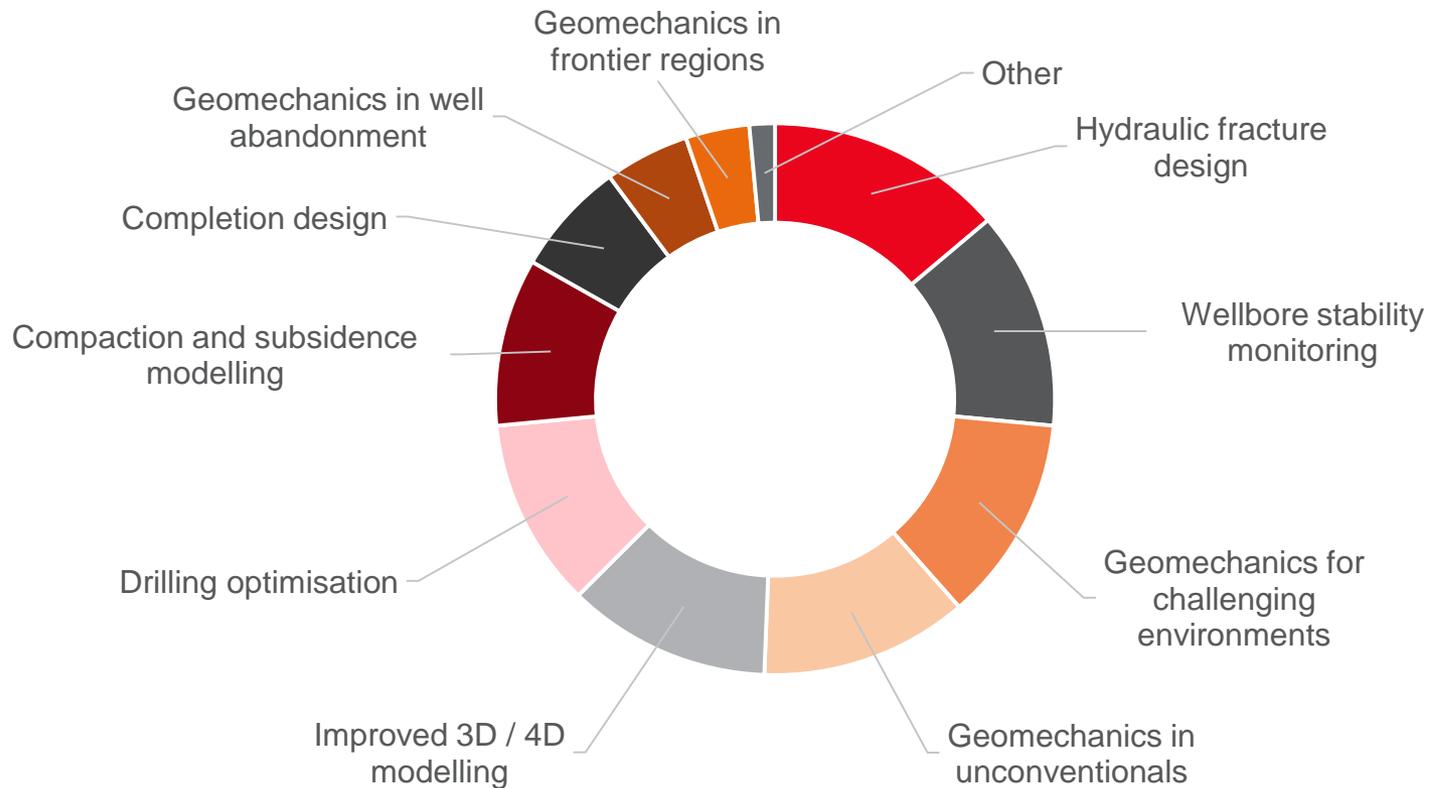
Software platforms will adapt to include geomechanics through the lifecycle of the field, together with the basic model and the reservoir model

With advanced measuring technology, optimisation in coupled simulation and increase in computer speed, the benefit of conducting geomechanical studies beside other engineering will become a totally standard task required to be checked off

More modelling and simulation which will be the basis of more practical decision making

# What are the priority knowledge-sharing areas for geomechanics?

There were a wide range of opinions on the priority of knowledge-sharing areas implying that there is improvement needed in geomechanics knowledge-sharing across the industry



# Summary

- From the survey and discussions, we determined that there was a requirement in the industry for some form of collaborations/ knowledge sharing on geomechanics outside of the existing forums
- As the discipline grows, it will have far reaching effects across the well life cycle and interact with many other disciplines
- This meeting is to explore what types of information could be shared in such a forum through presentations/ discussions
- At the end of the meeting, if there is sufficient interest, we will define the scope and topic areas for the proposed Geomechanics Initiative

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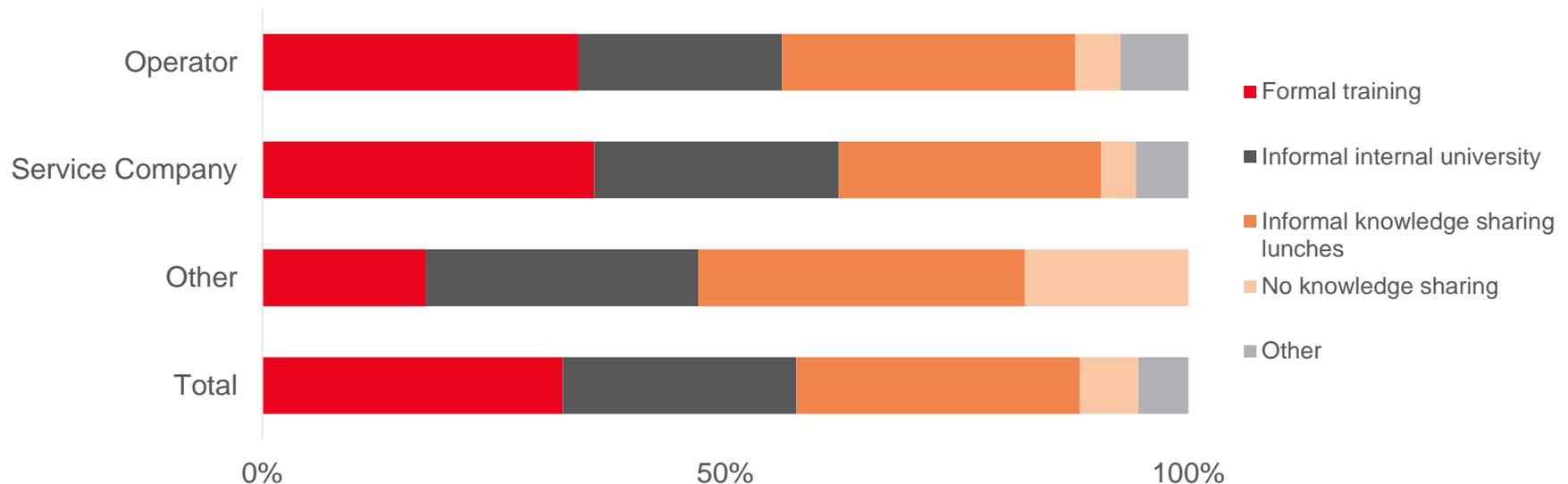
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# Operator Presentations

# Discussion

## How does your geomechanics team currently share knowledge across departments?

- The common method for sharing knowledge in operators and service companies is through formal training
- However, it is becoming increasingly common to share information by more informal routes such as an internal university or knowledge-sharing lunches
- Only a limited number of operator and service company representatives believe their companies do not share knowledge



## Do you think there may be widespread adoption of geomechanics as industry moves to more complicated fields and reservoirs?

- The overwhelming majority of participants replied saying that they felt there would be more widespread adoption of geomechanics as the industry moves to more complex reservoirs
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# How should we bound the scope/ topics to prevent overlap?

## Challenges:

- Complex modelling for fracture optimisation
- coupling with reservoir simulation
- Best practices to avoid induced seismicity
- Detailed view of formation damage problems
- More efficient workflows
- Better adoption of technologies
- Software development

## Well lifecycle:

- Reserve estimation and accessibility
- Well planning
- Drilling
- Completions
- Through life reservoir Geomechanics
- Decommissioning

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## Application areas:

- Wellbore stability monitoring
- Hydraulic fracture design
- Drilling optimisation
- Completion design
- Compaction and subsidence modelling
- Improved 3D / 4D modelling
- Challenging environments
- Unconventionals
- Frontier regions
- Well abandonment

## Disciplines:

- Pore pressure prediction
- Wellbore stability
- Sand prediction
- Fracture analysis
- Fault seal analysis
- Compaction and subsistence

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Next steps

## Scope and format

OTM propose one operator only meeting every 12 months where members benefit from the following:

- **Collaboration and networking** – The opportunity to network and share experiences/ lessons learnt with a leading group of operators. Individual and group opportunities for technology transfer, networking and learning from leading specialists
- **Powerful industry group** – The ability to influence the future development and direction of related technologies concerning geomechanics both internally and externally supported by the meeting deliverables
- **Managed discussion environment** – The opportunity for constructive discussion and debate in a relaxed environment managed by an experienced project manager with a technical background. Exposure to industry-relevant solutions from leading researchers and technology providers in the field of geomechanics
- **Tangible deliverables against set deadlines** – From minutes, to in depth meeting summaries, to material to be shared with external parties, OTM will provide the output you require to support your geomechanics activity

## Scope and format

OTM will launch and manage the forum for as long as will be required by the members; some of the key management services provided by OTM are listed below:

- **Secretariat** - Provide secretariat/ single point of contact, co-ordinate steering group
- **Budget reporting** - Monitor/ report on forum finances to participants on annual basis
- **Progress reporting** - Monitor/ report on forum progress to participants on annual basis
- **Progress meeting/ Workshop organisation** - Facilitate workshops/ meetings, working closely with yourselves and all participants to ensure that the full potential of the Forum is realised for all parties involved, and that your objectives are met
- **Website** - Create and maintain forum [website](#), the project website may include facilities for project promotion (public), report downloading (restricted), progress updating (restricted) and other facilities as the forum progresses
- **Documentation** - Manage documentation, including receipt of all project reports from you, uploading of reports to the forum website participant's area, and e-mail notification/ distribution of electronic report copies to all participants
- **Planning** - Assist with development of strategies and plans for further phases of work

## Next steps

- Would any of you be willing to be “champion(s)” for the Geomechanics initiative?
- Is there benefit in OTM formalising a proposal?
- Would you be willing to sign up in readiness for a launch meeting in September 2017?

Any Questions?

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