## Meeting minutes – 10 Nov 2018

We were all able to successfully have a group chat and audio call through Skype. Overall in the meeting we discussed the details of the flange/gasket problem, choose the technical details of how we will distribute code and other documents, picked our programming language (MATLAB) and started to assign the work.

Bijoy briefed us on some more details of the problem (and please correct any details that I might have gotten wrong)

* There is a 120 km offshore gas line in Indonesia that, come onshore at the receipt station. The receipt station is built on reclaimed land. The onshore section of the pipeline is built mostly on this reclaimed land and due to settling of the ground in the reclaimed land that the pipeline was built on, is causing additional loads on the pipe
  + The pipeline is 12”
  + It was designed to operate at a pressure of 100 bar but is currently operated at reduced load 40 bar due to leak on the flange joint
* Presently the leaks at the flange that have been clamped, but that is a temporary solution
* We know all the loads
  + Stress due to ground settling
  + Internal pressure
* Flange is made of a carbon steel(high strength steel ASTM A694 Gr.65 – with specified minimum yield strength -65,000psi) material
* Temperature changes (range from 0 to 65 deg C)
* Presently, spiral wound gasket are used on the joints.
* A change to Ring type joint(RTJ) is suggested by the engineering team and could be installed as a permanent solution, but will it work? i.e. will the RTJ gasket handle the high loads due to settlement.
  + We can machine RTJ groves to the flange at site so that the joint fits. All information on the RTJ and spiral wound gasket are available.
  + The other option is to use Pekotek type gasket. The information for this gasket is not available (vendor proprietary info), therefore it was decided not to consider this option.

In terms of project logistics

* Bijoy is the technical lead as he knows the problem best and has documents and models of various aspects of the problem
  + Sent out a document on details of the Pipe Flanges and Flanged Fittings (ASME B16.5)
  + Has model files of the flange and gasket
* Sam volunteered to be the code monkey
  + All code will be written in MATLAB
  + Code and other artifacts of the projects will be shared on a GITHUB project
  + Believes he can create code that can take a GMSH mesh file and derive the geometry related parts of the stiffness matrix and load vector
* Michael volunteered to do much of the writing of the actual final paper
* The Abaqus model will have to be shrunk down (we will need more than 1000 nodes of the free version and maybe more than the 20,000 nodes of the educational version)
* There is symmetry to the problem which may help ease the computational burden
* Ultimately we want to do the analysis to answer the question, will using the proposed flange handle the loads on the pipe and prevent a leak?

We will meet at the same time (8 AM CST) next Saturday, and we will of course send e-mails and have impromptu meetings as needed through the week.