**Design of Assessment Instruments and Tools for the Materials in FESS**

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**To have Access to this part of the PhD Proposal 1, please type M17 in search box of: http://ewindfly.shubayr.net**

Materials have an important role in FESS due to engineers want to evaluate potential failure mechanism of flywheels, specially the flywheels constructed with fibre composites. For this reason, developing analytical codes for predicting elastic and viscoelastic (long-term) behaviour for flywheel design should be considered. I want to be able to propose material characterization and test matrices to design the flywheel of this PhD Proposal with maximum performance.

Testing methods and devices for performance validation of the flywheel should be developed. Methodology for design and manufacture of the flywheel in Australia also should be presented in this research.

Long term stability, size and mass, power efficiency are important issues which comes first, then material issues discussed above should be analysed. The following materials issues are related to FESS which need to be evaluated in this research:

1. Stone Rim
2. Steel Rim
3. Composite Rim
4. Super conducting magnetic bearing (SMB or AMB)
5. Super conducting stator of YBCO Bulks
6. NdFEB permanent magnet circuit and levitation force
7. Preloading or super-cooling method for flywheel materials
8. Radial magnetic bearing VS three axis bearing VS back up bearing VS Combo bearing
9. Composite Multi-Ring
10. flywheel rim
11. Energy density of flywheel VS its materials
12. Wet filament wound Nanotube rope [WFWNR], in which the fibres are arranged in the hoop direction
13. Time-temperature dependant response of [WFWNR] for flywheel rotors
14. Load carrying capacity of [WFWNR]
15. Rotor material IM7/8552
16. Materials which would resist under 5×10-6/s to 5×10-3/s strain rate
17. Creep and Stress Relaxation Test with 72 hours recovery

In this research I aim to design my “Assessment Instruments and Tools” for evaluation of all materials used for construction of the FESS in this project. The Assessment Instruments and Tools which I plan to develop for materials in this FESS project would use the following links as template and guides only. However the context of these tools and assessments would be engineering resources, not the following contexts.

​**Templates:**

​Please click on the following links to see good examples of "**Assessment Tools**" in different contexts:

​[Interdisciplinary Perspective Rubric for Test Questions Papers](https://sites.laverne.edu/institutional-research/files/2011/11/Interdisciplinary-perspective-rubric-1999.pdf)

[Assessment Tool 1: Rubric](http://www.teach-nology.com/web_tools/rubrics/)         **<<<=** Please click on links: 6, 20, 21,10, 26, 25, 24, 23, 22

 and 12 in this website

​[Templates for Creating Project-Based Assessment Rubrics](http://rubistar.4teachers.org/index.php?screen=NewRubric&section_id=2)

​[Rubrics make scoring easy](http://www.teach-nology.com/web_tools/rubrics/rubricscoring.html)

[How to Create an outline for a Rubric?](http://www.teach-nology.com/web_tools/rubrics/rubricoutline.html)

[How to tell if your Rubric works?](http://www.teach-nology.com/web_tools/rubrics/rubricoutline.html)

[The Pros and Cons of Using Rubrics](http://www.teach-nology.com/web_tools/rubrics/rubricprocon.html)

[Why Rubrics?](http://www.teach-nology.com/tutorials/teaching/rubrics/)

​Please click on the following links to see good examples of "**Assessment Instruments**":

[Assessment Instruments](https://www.smu.edu/Provost/assessment/UniversityCurriculum/AssessmentInstrument)

[Developing Assessment Instruments](https://www.slideshare.net/ericwinke/developing-assessment-instruments-11710771)

[How to select an Instrument for assessing student learning](https://publications.iadb.org/bitstream/handle/11319/6758/How%20to%20select%20an%20instrument%20for%20assessing%20student%20learning.pdf?sequence=4)

​[Materials characterization services](http://www.campoly.com/cpg-services/analytical-testing/materialcharacterizationservice/?gclid=CjwKCAiAr_TQBRB5EiwAC_QCq1Mpr2iPCClmR9xqmDZguhGwdCpp38W2XajUmHJF7cm_wqMFnld-WRoCAVQQAvD_BwE)

​[Guide to developing assessment Tools](https://www.asqa.gov.au/sites/g/files/net2166/f/Guide_to_developing_assessment_tools.pdf)