

The NASA

LangleyEdge

NASA LANGLEY RESEARCH CENTER

NASA Langley Research Center is actively seeking partnerships and collaborations to commercialize its Mass Density Sensor technology.

The Market Opportunities

Commercial applications of this technology include:

- Measuring mass density of filament or yarns such as:
 - nylon
 - polyester
 - optical fiber
 - other synthetic yarns
- Other measurements:
 - spin finish
 - resin applied to tows
 - coatings

The Benefits

The vibrational method of this technology offers advantages over other techniques for continuously measuring mass density of yarn. For example, one competing method measures the mass related to capacitance of the yarn, which requires a precise gap between the sensor and yarn. Such precision is difficult when yarn thickness varies. Moreover, capacitance measurements are subject to electromagnetic interference.

Other benefits of the technology include:

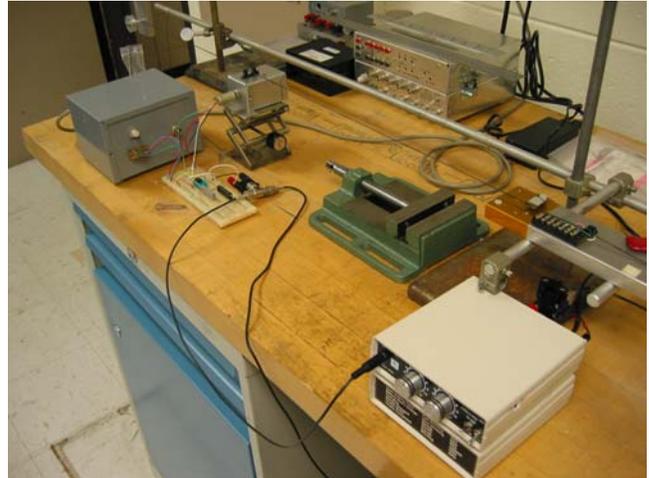
- easily functions as a non-intrusive, continuous measurement process allowing operation at hundreds of feet-per-minute
- is robust and easy to install and operate
- obviates special safety instructions

The Technology

The instrument includes fixtures that place a length of yarn under a known tension across one support that is movable and another one that is fixed. Transverse vibrations are induced in the yarn by moving the

Mass Density Sensor

Continuous Measurement of Mass Density of Yarn



Mass Density Sensor Test Rig

movable support up and down. The movable support can excite the yarn in either of two ways: 1) by applying a single pulse to generate free vibration; or 2) by jiggling the yarn continuously to tune the frequency of excitation gradually until resonance is found.

A source of light illuminates the photodetector at the mid-length of the yarn. The photodetector senses the repeated shadowing caused by the vibration of the yarn through the light. The electrical pulses generated by the photodetector are amplified and used to provide feedback to a transducer, thereby producing an augmented resonance response from the vibrating yarn. This signal is then displayed to give a measure of mass density.

Additional Information

To discuss in detail how this technology can profit you and your business, please contact:

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Making Aerospace Commonplace



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