
"Transformation et Classement éco-Efficents des Qualités Secondaires de chêne pour leur valorisation en bois d'œuvre" project DMP

Plan de gestion de données créé à l'aide de DMP OPIDoR, basé sur le modèle "ANR - DMP template (english)" fourni par Agence nationale de la recherche (ANR).

Plan Details

Plan title	"Transformation et Classement éco-Efficents des Qualités Secondaires de chêne pour leur valorisation en bois d'œuvre" project DMP
Fields of science and technology (from OECD classification)	Mechanical engineering, Agriculture, forestry, and fisheries
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Project Details

Project title	Transformation et Classement éco-Efficents des Qualités Secondaires de chêne pour leur valorisation en bois d'œuvre
Acronym	TreCEffiQuaS
Abstract	<p>Among the large wood resources of France, a significant percentage is still undervalued. In particular, the hardwood with a low quality, a high flexuosity, a small diameter and generally too many knots are only used as firewood or for the slushing. On the other hand, the France suffers from a negative economic balance due the importation of wood products (about a billion euros per year). The potential of the hardwood biomass is underestimated and requires research and development to optimize its usage and processing, and thereby creating value, inducing better energy efficiency and increasing CO2 storage.</p> <p>The 1st objective of the TreCEffiQuaS project is to propose an efficient method for oak timber grading according to European standards. For this purpose, the LaBoMaP is developing an industrial grading method for the hardwood based on fibers orientation scanning. In particular, the work will focus on grading oak in the type of cross-sections and loading (tension) corresponding to modern construction products such as glued laminated timber or cross laminated timber. The 2nd objective is to optimize the efficiency of the production of finger-jointed hardwood lamellas. For low-quality hardwoods, optimizing the operation of crosscutting boards can allow to reduce the drying</p>

deformations due to fibers deviation and knots, while guaranteeing a high mechanical strength of finger-joints. It has been shown that it was possible to predict wood deformations due to drying on the basis of fiber orientation scanning. A 1st algorithm aimed to optimize square-edged boards crosscutting to guarantee finger-joints strength has been proposed. 2000 oak boards have been sampled, sawned, planed and scanned. They are now being tested under mechanical loading. The expected results should be:

- a more accurate and efficient oak grading (and potentially of other hardwoods),
- developing of new standards for hardwood strength classes under tensile loading, or the engineered hardwood products (CLT, Glulam)
- proposing a method to guarantee the strength of finger-jointed laminates, while optimizing raw material yield.

Funding

- ADEME : 2003C0065

Start date 2021-03-19

End date 2024-03-18

Partners

- FCBA
- Ducerf
- ADEME
- AMVALOR

Research outputs :

1. Experimental Data (Dataset)

Contributors

Name	Affiliation	Roles
pot guillaume - https://orcid.org/ 0000-0001-9751-251X	200214907Z	<ul style="list-style-type: none"> • DMP manager • Personne contact pour les données • Project coordinator
Viguiier Joffrey - https://orcid.org/ 0000-0001-7926-599X	200214907Z	

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1. Data description and collection or re-use of existing data

1a. How will new data be collected or produced and/or how will existing data be re-used?

This project will produce experimental data implying different devices such as cameras, industrial board scanner, vibration test devices, mechanical testing machines, and other manual measurements.

This dataset can be directly used for the development of strength grading algorithms since it includes all the measurement made by current board scanners and vibration testing devices, plus board traceability from the tree. This database is suitable for working on the development of processing algorithms for timber strength grading.

1b. What data (for example the kind, formats, and volumes), will be collected or produced?

This dataset include images and measurements at several steps of the sawing process of french oak logs from the sawmill logyard to the machine grading and destructive testing of wooden boards.

A total of 122 logs, and more than 2000 boards has been analysed.

The image data is recorded in image format or in .pkl and .mat files, which are readable with Python or MATLAB software. It includes RGB images of log ends and board ends, a set of images of the boards (RGB, laser and X-rays) obtained with an industrial board grading machine.

The measurements are recorded in .csv files and include wood density, mechanical properties of each board obtained by vibratory and static testing, and visual grading of the boards.

2. Documentation and data quality

2a. What metadata and documentation (for example the methodology of data collection and way of organising data) will accompany the data?

A .txt file describing the folder structure will accompany the data. Each table or group of data will be described in a .txt file with the variable name, unit and description. A scientific data paper will accompany the dataset with all the details relative to data collection.

2b. What data quality control measures will be used?

The quality of data depends on the accuracy of different machines or cameras for which technical data will be shared in the accompanying data paper. The consistency of all the data is peer reviewed by at least two different people.

3. Storage and backup during the research process

3a. How will data and metadata be stored and backed up during the research?

Immediately after acquisition the raw data is saved on a local network-attached storage (NAS) device at ENSAM Cluny, France. This NAS uses RAID 5 to automatically duplicate all files onto two independent hard drives. To ensure the perennity of the data, it is also copied on a Microsoft OneDrive Cloud handled by ENSAM. A third copy is made on a personal hard drive not connected to any network.

3b. How will data security and protection of sensitive data be taken care during the research

Only the participant to the project have access to the NAS and the OneDrive Cloud storage. In regards to data protection, the data is not considered to be sensitive.

4. Legal and ethical requirements, code of conduct

4a. If personal data are processed, how will compliance with legislation on personal data and on security be ensured?

No personal data will be processed.

4b. How will other legal issues, such as intellectual property rights and ownership, be managed? What legislation is applicable?

The data belong to the main partners of the project: ENSAM, FCBA and Ducerf Group. Data will be shared under Creative Commons Attribution Non-Commercial Share Alike license (CC-BY-NC-SA). Whenever possible and meaningful, results will be submitted to an institutional IP office (AMVALOR) for possible patent filing.

4c. What ethical issues and codes of conduct are there, and how will they be taken into account?

The participants will comply with the French charter of ethics for research professions (<https://comite-ethique.cnrs.fr/charte/#:~:text=L'objectif%20d'une%20charte,les%20partenariats%20nationaux%20et%20internationaux.>), in particular concerning the integrity in data collection.

5. Data sharing and long-term preservation

5a. How and when will data be shared? Are there possible restrictions to data sharing or embargo reasons?

The data will be made openly available without restriction or embargo no later than 6 months after the end date of the project.

5b. How will data for preservation be selected, and where data will be preserved long-term (for example a data repository or archive)?

All the data relevant for possible scientific usage and described in the data paper will be long-term preserved on <https://data.inrae.fr/> or zenodo.org - data on Zenodo.org is for at least the next 20 years.

5c. What methods or software tools are needed to access and use data?

Zenodo.org provides access to metadata and data files via standard protocols such as HTTP and OAI-PMH. Python or MATLAB can be used to use a part of the data.

5d. How will the application of a unique and persistent identifier (such as a Digital Object Identifier (DOI)) to each data set be ensured?

A Digital Object Identifier (DOI) will be attributed to the dataset when it is archived on a data repository like <https://data.inrae.fr/> or zenodo.org.

6. Data management responsibilities and resources

6a. Who (for example role, position, and institution) will be responsible for data management (i.e. the data steward)?

The coordinator of this project, Guillaume Pot (Associate professor at ENSAM Cluny) will be responsible for data management, in collaboration with Joffrey Viguiere (Associate professor at ENSAM Cluny).

6b. What resources (for example financial and time) will be dedicated to data management and ensuring that data will be FAIR (Findable, Accessible, Interoperable, Re-usable)?

Funding for the local storage of data is provided by the host institute. Storage of data on <https://data.inrae.fr/> or Zenodo.org is free to the user.

The use of open file formats help to ensure that the data will be FAIR.