MatchID
Metrology beyond colors

January 2025

Newsletter 2025/1

Breaking the law!

While 2024 took a firestart, it ended with a rocket launch. What an amazing year we had again! Commercially, we achieved better numbers than ever before, in spite of a considerable personnel growth, substantial marketing investments and celebration parties for 10 years of MatchID. The origin of this achievement is twofold: a large number of new high-end customers and a very loyal (and satisfied!) set of existing clients renewing their licences. This clearly rewards the efforts we put in every new release to bring innovative integrated DIC solutions to the market!

Moreover, it is very satisfying to observe that MatchID breaks the startup economical J-curve law of H. Love, whereby a company initially dips after its start. We never fell to this Valley of Death, thanks to the efforts of our team, our partners and distributors, and most importantly because of you, our customers!

To further improve our products and also explore a complementary market, we are extremely proud of our unique fracture mechanics module that provides dedicated solutions for crack detection and propagation, including automated crack detection, stress intensity factors and J-integrals, among many other features. We are convinced that this extensive module is the most advanced commercially available for fracture mechanics relying on full-field measurements. Try it out today!

Thanks to our customers, one also gets in contact with applications that are less obvious. Further on, you will read about the use of our virtual fields method on historic stone masonry to better understand the impact of the devastating earthquakes that occurred in Turkey and Syria last year. Do you need DIC for charity work? Please let us know, we are more than happy to support free of charge!

The upcoming year has many things to come, but two important events are to be highlighted. First, we will organize two DIC courses, one in French in Paris in collaboration with our partner Mecatest, and one in San Francisco with MatchID US Inc. Next, in October, the free MatchID User & Training days will take place in Ghent, Belgium. A great opportunity to get to know the team and discover many underlying aspects of our platform. Looking forward to meeting you all there!

-The MatchID Team

In this issue

In addition to our traditional annual team-building event, this year we introduced a MatchID sports day. Turns out, the MatchID team is just as driven on the field as they are in the office! Who knew we had so many sports enthusiasts hiding behind their desks?

MatchID 2025.1

What's new?

MatchID 2025.1 is out now! We are thrilled to bring you the efforts of six months of work resulting into a set of versatile new features, amongst which:

Fracture mechanics module:

New tools as part of our main package for Williams series expansion for crack-tip detection and stress intensity factors; path and domain J-integrals and J-integral geometry convergence study.

Multi-camera numerical image deformation:

Generate synthetic images for more than two cameras to optimize and verify your multi-camera setup.

Validation of FEA and DIC alignment accuracy via **depth-distance maps**.

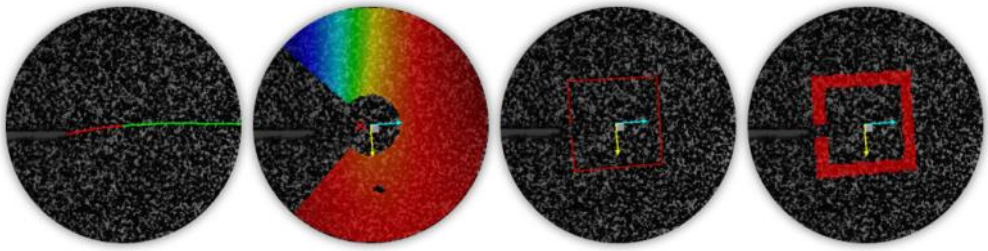
Forming limit curves via ISO124002-2

Imaging Source quasi-static cameras:

Built-in adjustable focal distance functionality (integrated zoom lens). Flexibility for structural testing!

Export individual datasets for direct reimport in to the results viewer.

Projective DIC allows to use a projected speckle pattern to compare shapes at various load steps. Useful for vibration measurements with a predominant vibration direction, or for fast shape acquisition.



From automated crack path detection to J-integral calculation, MatchID is proud to announce the brand new fracture mechanics module, allowing the experimental investigation of cracked samples using DIC.

Brand new fracture mechanics module

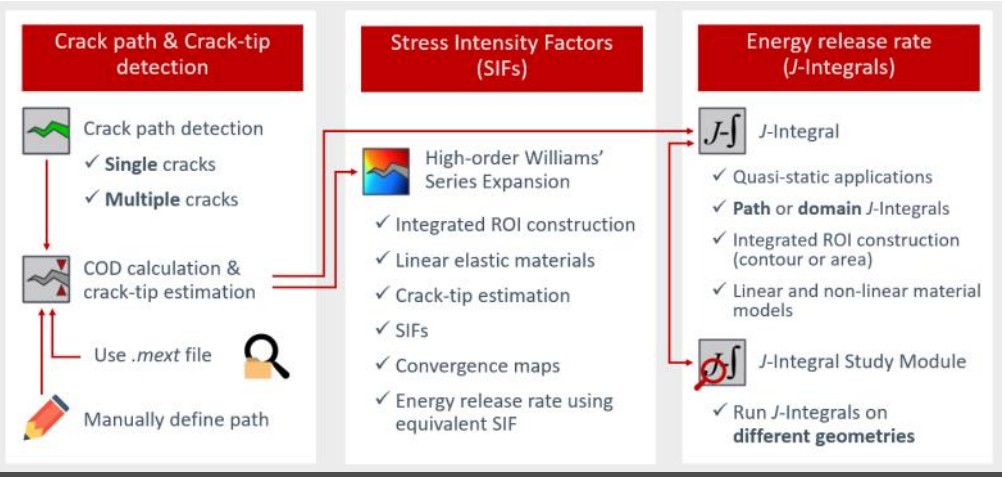
It is well known that the study of fractured materials is not a straightforward task. Fracture mechanics is extremely important to predict failure since it is focused on the behavior of cracked materials and the propagation of cracks under various loading conditions. **Powered by the philosophy of MatchID of having out-of-the-box post-processing tools, our new fracture mechanics module condenses the most important features on crack analysis, allowing a profound experimental study of cracks using DIC.** The module was developed with the collaboration of some professors and researchers well known in the field. Their feedback was extremely important to come up with a reliable, robust and easy-to-use module. Several case studies were caried out in this sense to verify and validate the implementations using experimental and synthetic data (here, MatchID FEDEF was extensively used to generate synthetic images).

What can be done in MatchID?

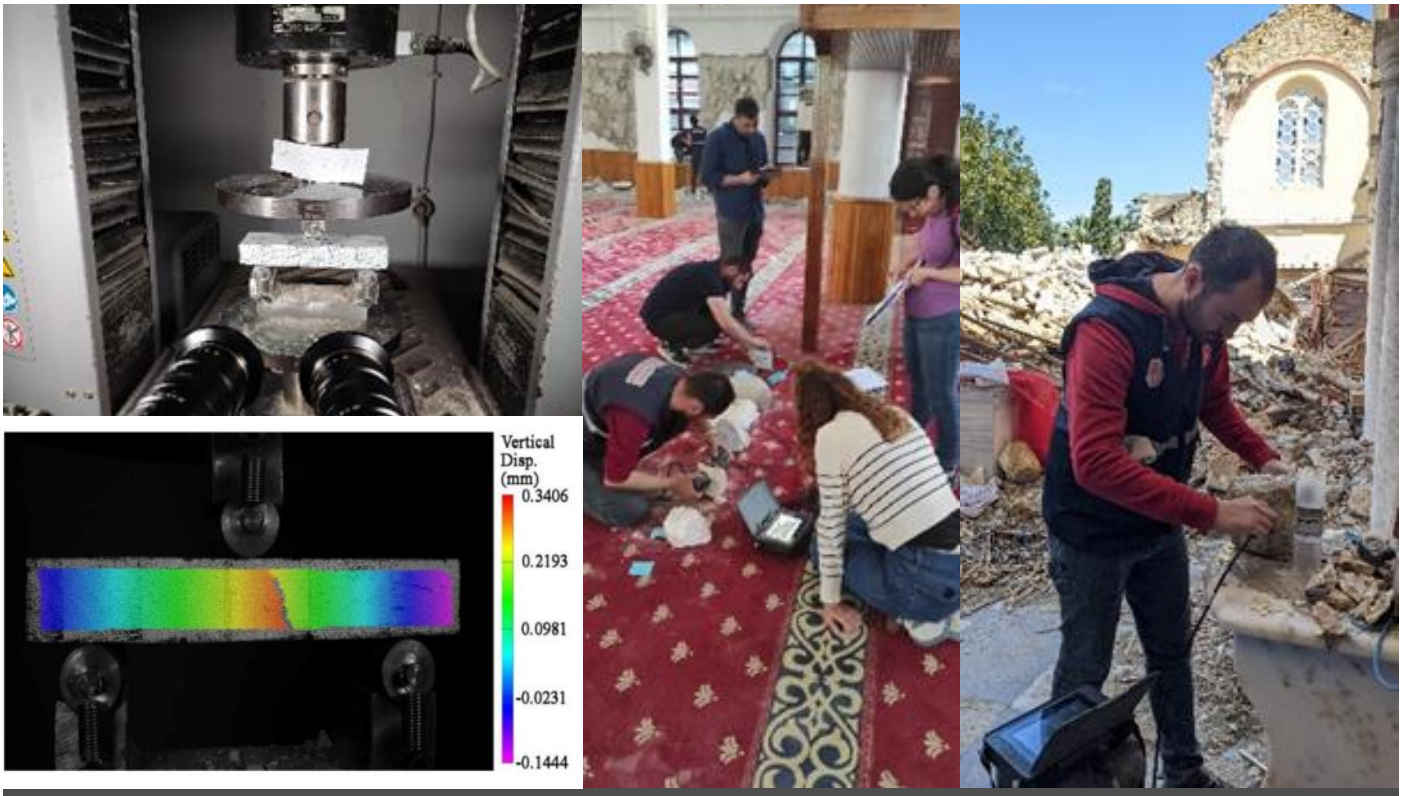
The module allows the **automatic detection of single and multiple cracks using a strain-based approach**, that can be used to later extract the **Crack Opening Displacements (COD)** considering the intersection point between COD curves and a threshold level defined by the user. The **Stress Intensity Factors (SIFs)** can be estimated and the **crack-tip position predefined by COD can be adjusted** by means of the well known **high-order Williams' Series** formulation. The **energy release rate** can be computed by means of the **equivalent SIFs** and **J-Integrals** can be extracted using both **path** and **domain approaches**. A parametric study can be performed using different geometries to identify the most appropriate path/domain for J-Integral calculation.

Are you interested?

More details on how to use this module can be found on our **Wiki** page and on our **YouTube** channel. Additionally, check out our **Application Notes** and **Webinar** (scan the QR code) on fracture mechanics. Good news: this module comes with our main DIC package at no extra cost!



Fracture Mechanics Module workflow.



MatchID supports research on the characterisation of the materials of historic stone buildings which were damaged during the 2023 Turkey-Syria earthquakes. The research aims to provide underpinning data to support forensic investigations and restoration projects.

Application in the picture: investigating the earthquake response of historic stone masonry: a study of material properties in south-east Turkey

A series of devastating earthquakes occurred in Turkey and Syria last year. In the months following the earthquake, field missions were organised by researchers from the University of Oxford to investigate the earthquake response of historic stone masonry structures in south-east Turkey. Non-destructive field measurements [1] suggested that low-strength construction materials may have played an important role in the failures. This led to further work, supported by MatchID, to conduct lab-based mechanical characterisation of construction materials.

"By combining non-destructive field measurements with advanced digital analysis, we are uncovering the vital role that construction materials play in the resilience of historic structures, laying the foundation for future restoration and forensic efforts."

- Sinan Acikgoz -

Mechanical properties of historic construction materials (such as clay bricks, natural stones and lime mortars) vary widely and are difficult to obtain. Due to conservation requirements, only small samples can be extracted, which are typically insufficient for standard characterisation tests. Working with MatchID's Digital Image Correlation software enabled researchers to conduct non-contact measurements on small stone samples, which were used for flexural strength and elasticity characterisation. Researchers also demonstrated the importance of conducting Virtual Fields Method on opposite faces of samples under compression for robust identification.

This research is providing a database of material properties which will underpin future forensic investigations and restoration projects. Nearly two hundred mechanical tests have been conducted for this purpose at the Istanbul Technical University alongside other physical and chemical characterisation tests at Gazi University.

[1] Bozyigit, B., Ozdemir, A., Donmez, K., Dalgic, K. D., Durgut, E., Yesilyurt, C., ... & Acikgoz, S. (2024). Damage to monumental masonry buildings in Hatay and Osmaniye following the 2023 Turkey earthquake sequence: The role of wall geometry, construction quality, and material properties. Earthquake Spectra, 87552930241247031.

User & Training days

We are pleased to invite our users to the MatchID User & Training days in Ghent, Belgium, on October 8th and 9th, 2025. This event provides a unique opportunity to engage with our latest software updates, enhance your knowledge, and exchange experiences with other professionals in the field. The two-day event will focus on practical training, new features, and advanced techniques, ensuring that participants can make the most of the software in their research and applications. We look forward to fostering a collaborative environment for learning and discussion.

DIC course 2025

Join us for the 11th Digital Image Correlation (DIC) course in Dublin, California! This 3-day intensive course covers the fundamentals of DIC, including practical lab sessions, individual data analysis, and hands-on learning. By the end of the course, you'll gain the skills to confidently use DIC technology to achieve accurate, validated results.

Register now and enhance your DIC expertise this summer!

Additionally, we're hosting a second Digital Image Correlation (DIC) course in French, in partnership with Mecatest. This two-day, theory-focused training will cover key DIC concepts, feature practical demos, and include Q&A sessions. Perfect for French-speaking customers who want to deepen their theoretical understanding.

Meet MatchID at:

- ***Webinars:*** *a 45 min-journey to a specific MatchID product illustrating its capacities towards a large range of applications*

  ⇒ 12/03/2025 Webinar 1 - Uncertainty quantification in DIC

- ***Conferences and expositions:***

  ⇒ ESAFORM Conference - Paestum, Italy - 06/05/2025
  ⇒ SEM - Milwaukee, USA 02/06/2025
  ⇒ ESMC - Lyon, France - 07/07/2025
  ⇒ Numisheet - Munich, Germany - 07/07/2025

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