

# IM-SAFE

PAN-EU CoP Meeting

### Change Management, guidelines to implement the proposed new standards

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# 14:40 - 15:00 Session 2: Recommendations about the set-up of pilot projects

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# Purpose of Task 5.2

### **Change management, adoption plan and pilot setup**

### 1. GOALS

- to raise the **awareness** about the necessity to develop and adopt the new standards;
- to identify and remove the **PEST barriers** related to different stakeholders;
- to motivate decision-makers in the public and commercial organisations to **improve the knowledge and** skills of their employees about the new standards.

### 2. RESULTS

- Awareness campaign (video)
- Practical guidelines ('self-instruction')
- Generic setup for future pilot projects
- Evaluation method ('self assessment')

This session provides guidance on the setup of pilot projects and recommendations for the follow-up upscaling to support the practical application of the 3 new standards on:

- structural monitoring
- data-informed safety assessment
- preventive maintenance in real-world cases.







### Main objectives Project context

A **PILOT** is a way of testing a **theoretical model, new technology, process, system, product,** partnership, or related project **on a small-scale level**, in order to:

- evaluate its full impact, benefits and weaknesses
- discover **potential problems** that may arise on a full-scale deployment.

### **OBJECTIVE:**



Development of a generic setup for future pilot projects, and an evaluation method to assist the stakeholders to carefully plan the initial settings of the pilot projects depending on the needs of their organisations, and the selected scope in terms of:

- ✓ ORGANISATIONAL
- ✓ TECHNICAL
- ✓ FINANCIAL
- ✓ HUMAN RESOURCE CAPACITIES
- ✓ REPLICATION POSSIBILITIES







### Main objectives Project context



- Combination of practical applications, their step-by-step development and the gradual integration into the implementation of the new standards;
- Organisational development and change process to increase acceptance;
- Further development of the software tools;
- Education and training of employees to become experts.



An evaluation method will also be developed to assess:

- The user need for upscaling;
- The adaptability of the new standards implementation approach;
- Organisational capacity for a smooth transition to the new standards
- Feedback and learning loops internally within an organisation and externally between the value-chain stakeholders in the field of SHM, safety and asset management.









There are **5 KEY STEPS** to conduct a pilot project:

- PILOT DEFINITION
- PILOT MONITORING AND EVALUATION
- PILOT EXECUTION
- CONCLUSIONS
- DEPLOYMENT



























### **Pilot Project** IM-SAFE Template

|                                       | [PILOT PROJECT TITLE]   |                   |   |  |  |  |  |  |  |
|---------------------------------------|---|-------------------|---|--|--|--|--|--|--|
| PILOT OVERVIEW                        |   | PILOT DETAILED DE | SCRIPTION   |  |  |  |  |  |  |
| Project name<br>Project acronym       |   |                   | The definition of the working group includes the list of participants, the<br>characterisation of those involved in terms of competencies and description of the  |  |  |  |  |  |  |
| Project coordinator                   |   |                   | the working group depends on the size of the pilot.   | PILOT MONITORING & EVALUATION  |  |  |  |  |  |
| Participants                          |   |                   | A second size of the first first of the second size of size to  |  | Individual success criteria should be specified across the following categories:   |  |  |  |  |
| Funding required                      |   | I                 | <ul> <li>A small size pilot implies imited knowledge/expertise and single<br/>representants for each stakeholder, whose aim is to acquire basic skills</li> </ul>   |  | <ul> <li>Scope-the project fulfils all the objectives given in the definition phase.</li> </ul>  |  |  |  |  |
| Expected duration                     |   | Working group     | <ul> <li>A medium size pilot implies basic knowledge/expertise and multiple</li> </ul>  |  | <ul> <li>Schedule- the project is completed in the set time limit set.</li> </ul>  |  |  |  |  |
| PILOT GENERAL DE                      | SCRIPTION   |                   | representants for each stakeholder, whose aim is to deepen the knowledge  |  | <ul> <li>Budget- The project bas to be completed within the budget allocated.</li> </ul>   |  |  |  |  |
|                                       | Introduction of the general context and overall scenario (e.g. sectoral, technological,<br>territorial and corporate) in which the proposal is set, the need and motivations that<br>led to the realisation of the project and the type of problem to which it is proposed to<br>provide a solution. Highlight the relevance of the project to the proposed objectives.<br>Also provide, if available, information on the economical context in which the project       |                   | <ul> <li>through practical applications.</li> <li>A large size pilot implies good knowledge/expertise and an extended group of<br/>experts, whose aim is to prove the state of art of proven technologies/<br/>methodologies.</li> </ul>  | Success criteria   | User satisfaction- I he project meets consumer demand.     Quality-The project delivers the top quality of any product or service.     Team goals- The team gains experience and is satisfied with the project     results     Deliverables- The project has <u>an</u> high quality deliverable.   |  |  |  |  |
| Concept, motivation & objectives      | is set. Example questions to consider/answer: Which new standard(s) are implemented? Which type of structure(s) are considered? What should the pilot project accomplish? What are the technical objectives?  | Timeline          | The timeframe needed for the pilot depends on its size: as the size of the pilot<br>increases, the time required for project development increases. For each phase a<br>list of activities should be defined, as well as the established deadlines and the<br>contribution of each participant to the actions above. It should be noted that the<br>peopl of fine to be considered depends on the pilot objectives.         |  | <ul> <li>Resource capacity. The project has a proper resource allocation and<br/>understanding of the resource capacity.</li> <li>Risk management. The project successfully identifies every tangible or<br/>intangible risks.</li> <li>Documentation- The documentation of the entire project gives a clear picture<br/>of every step of the project.</li> </ul>  |  |  |  |  |
| Innovations pursued in the project    | What are the additional objectives related to the implementation of the new standards?     Highlight and describe the innovative value and elements of originality of the project, as well as any improvements/adaptations to existing solutions. Exclaim why   |                   | The timeline analysis should encompass:<br>• duration of the project<br>• time schedule<br>• final objective and intermediate goals   | Testing group choice   | To ensure that pilot performs effectively, a study group to test it out should be gathered. For instance, in case of a pilot project that aims to release a new product, it is recommended to provide a prototype or less established version of the item for your group to try. The results of the pilot are evaluated based on indicators, which are the variables to be measured and analysed. Indicators might be quantitative and/or qualitative. Quantitative indicator share numeric values (quantitative) and or easier to measure, while qualitative indicators are much harder to measure. |  |  |  |  |
|                                       | the intended results are competitive. Explain the main technical technical scientific obstacles to be overcome and the prospective validity of the project.     Example questions to consider/answer:         How will this plict generate innovation for your organisation?         What innovative softing/innovation matheddows as you considering?  |                   |   |  |  |  |  |  |  |
|                                       | What innovative product/service/materials/components are you downloading :     What innovative product/service/materials/components are you developing/using for the project?     Is it an application of existing solutions to a new application context?  | Tools             | Description of the tools to be used within the pilot project, for instance: Training tools Project management tools Dedicated software.   | Information required to<br>perform the evaluation<br>(variables to be<br>measured) |  |  |  |  |  |
| Teohnical and economic sustainability | Outline the level of maturity of the technical solutions envisaged and the feasibility of the project, in terms of time and costs, highlighting the ability to deal with possible risks (negative results) during the activity.         Example questions to consider/answer.         • Do you envision an effertile for the pilot activities?         • Do you have thoughts on how your pilot activity could be made sustainable?         • Could the pilot scale up? | Financial plan    | Personnel costs, cost of fools, equipment, cost of consultancy services, additional<br>overheads, other operating costs are some of the costs to be considered in the<br>financial planning. The financial plan bes to be evaluated based on the objectives<br>set for the pilot, for which the funds needed may differ significantly. Generally, the<br>funds needed are directly proportional to the size of the project. | Define the mechanism<br>for doing the evaluation<br>of the pilot                   | Indicators can be measured daily ( <u>E.e.</u> daily usage of computer devices), weekly, or<br>per case results (i.e. total % of equipment that failed).<br>Define the mechanism, <u>e.g.</u> processes, formats, responsibilities for obtaining the<br>data needed to perform the evaluation, such as:<br>• Stakeholders whose inputs are important to evaluate the pilot<br>• Information required to perform the evaluation<br>• Processes, formats, responsibilities for obtaining the data needed to perform<br>the evaluation<br>• Automatic <u>body</u> :                                     |  |  |  |  |
|                                       |   |                   |   |  | <ul> <li>External, such as <u>observers</u>;</li> <li>Subjective: participants can document their impressions, <u>experieppes</u> and<br/>ideas through tools like journals or diaries, questionnaires, tables or forms.</li> </ul>  |  |  |  |  |







### **Pilot Project** Alternatives



- ✓ short-term involvement
- ✓ more limited budget
- ✓ simpler objectives, quicker results obtained

- ✓ medium-sized working group and medium-term involvement
- aim to further the objectives of the project with a greater financial investment

 Iong-term investment in terms of resources and economic investment to respond to complex objectives

LARGE SIZE PILOT







## **Mandate draft objectives**





n.3 WORKED EXAMPLES PILOTS







## **Mandate draft objectives**













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Worked Example





### **Pilot Projects** Worked example n.1



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NEW STANDARD ON STRUCTURAL MONITORING

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Select the STANDARD TOPIC (1 or multiple) object of the pilot project:

- DECISION-MAKING REGARDING THE MONITORING STRATEGY
- DATA COLLECTION
- DATA PRE-PROCESSING
- DATA ANALYSIS
- DATA STORAGE AND MANAGEMENT

Set the WORKING GROUP – representatives of the stakeholders (1 or multiple) :

- ASSET OWNERS AND SUPPLIERS OF FINANCIAL SERVICES
- ASSET MANAGERS
- ENGINEERING COMPANIES
- SUPPLIERS OF MATERIAL



Set FINANCIAL PLAN, TOOLS, TIMELINE as a function of the OBJECTIVES







### **Pilot Projects** Worked example n.1

NEW STANDARD ON STRUCTURAL MONITORING



### objectives from SWOT analysis **Stakeholders OPPORTUNITIES** ASSET OWNERS AND SUPPLIERS OF FINANCIAL SERVICES GOOD ASSET OPTIMIZED MPROVED CAPACITY INCREASED LEVEL OF MANAGEMENT ASSET MANAGERS AUTOMATION WITH IONITORING SYSTEMS FOR FORECASTING KNOWLEDGE ON THE SYSTEM FOR THE MODERN IMPROVED HIGH-LEVEL REDUCED IMPROVEMENT OF TECHNOLOGY OF THE REDUCTION IN THE CREATION OF A IMPROVEMENT OF DIGITAL THAT COMBINE NECESSARY STRUCTURAL EASIER IMPROVEMENT OF ENGINEERING COMPANIES DECISION MAKING (DUE TO MAINTENANCE AND AMOUNT OF STANDARD OF DATA COLLECTION MOST REPETITIVE RISK EVALUATION AND SYSTEM FOR ECONOMICAL LIMITS, WORKLOADS AND PERFORMANCE, **IDENTIFICATION OF** TRANSPARENCY IN DATA-DRIVEN DECISION INFRASTRUCTURE SYSTEMS/SIMPLICIT TECHNOLOGICAL OF MATERIAL MAINTENANCE TASKS RISK MANAGEMENT ASSET IMING EFFECTIVENESS IMPROVED STRUCTURAL WHICH OBJECTS OPERATIONS MAKING) COSTS FOR MONITORING STANDARDS BEHAVIOUR (I.E. MONTHLY DRONE MANAGEMENT AND VALUABLE STIMATION OF COSTS DIAGNOSTICS AND SHOULD BE SWARM). SUPPLIERS OF MATERIALS OUTCOMES AND BENEFITS SAFETY ASSESSMENT PRIORITIZED FOR MAINTENANCE DECISION-MAKING REGARDING THE MONITORING (STRATEGY DATA COLLECTION TOPIC DATA PRE-PROCESSING DATA ANALYSIS DATA STORAGE AND MANAGEMENT

STANDARDS Topics

= Pilot tasks



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**Pilot Projects** Worked example n.1

Prestressed concrete

**NEW STANDARD ON STRUCTURAL MONITORING** 









## **Mandate draft objectives**













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### **Pilot Projects** Worked example n.2

### FURTHER AMENDMENT TO THE EXISTING EU STANDARDS ON SAFETY ASSESSMENT TAKING INTO ACCOUNT INSPECTIONS, MONITORING AND TESTING



Select the STANDARD TOPIC (1 or multiple) object of the pilot project:

- MINIMUM RELIABILITY REQUIREMENTS AND REFERENCE PERIOD
- LIMIT STATE CONDITIONS
- DETERIORATION AND DAMAGE
- USE OF STRUCTURE-SPECIFIC INFORMATION FOR SAFETY ASSESSMENT

Set the WORKING GROUP – representatives of the stakeholders (1 or multiple) :

- ASSET OWNERS AND SUPPLIERS OF FINANCIAL SERVICES
- ASSET MANAGERS
- ENGINEERING COMPANIES
- SUPPLIERS OF SERVICES/TECHNOLOGIES

Set FINANCIAL PLAN, TOOLS, TIMELINE as a function of the OBJECTIVES







b

### **Pilot Projects** Worked example n.2

### FURTHER AMENDMENT TO THE EXISTING EU STANDARDS ON SAFETY ASSESSMENT TAKING INTO ACCOUNT INSPECTIONS, MONITORING AND TESTING

| Stakeholders |  | objectives from SWOT analysis                                      |   |   |  |   |   |  |  |  |  |  |   |   |  |  |  |
|--------------|--|--|---|---|--|---|---|--|--|--|--|--|---|---|--|--|--|
| 1            |  | Slukenoluers   |   |   |  |   |   |  |  |  |  |  |   |   |  |  |  |
|              | ASSET O'<br>FINANCI                        | WNERS AND SUPPLIERS OF   | OPPORTUNITIES   |   |  |   |   |  |  |  |  |  |   |   |  |  |  |
|              | ASSET M<br>ENGINEE<br>SUPPLIEF<br>SUPPLIEF | ANAGERS<br>ERING COMPANIES<br>RS OF TECHNOLOGIES<br>RS OF SERVICES | HARMONIZATION FOR<br>THE IMPROVEMENT OF<br>THE PERCEPTION OF THE<br>STATE OF THE ENTIRE<br>INFRASTRUCTURE | AVOID RECENT<br>CATASTROPHES DUE<br>TO LACK OF<br>MAINTENANCE | POTENTIAL<br>REDUCTION IN THE<br>FAILURE RATE OF<br>INFRASTRUCTURE | IMPROVING<br>HIGH-LEVEL<br>DECISION<br>MAKING | IMPROVED CAPACITY<br>FOR FORECASTING<br>NECESSARY<br>WORKLOADS AND<br>IMPROVED<br>ESTIMATION OF<br>COSTS AND BENEFITS | USE OF THE<br>STANDARDS AS<br>TOOLS TO ARGUE<br>FOR BETTER<br>MONITORING,<br>SUFFICIENT BUDGETS<br>AND BETTER<br>SOLUTIONS | INCREASED LEVEL OF<br>KNOWLEDGE ON THE<br>STRUCTURAL<br>PERFORMANCE,<br>STRUCTURAL<br>DIAGNOSTICS AND<br>SAFETY ASSESSMENT | IMPROVING<br>TRANSPARENCY IN<br>OPERATIONS | ENHANCED TOOLS<br>AND GUIDANCE<br>AVAILABLE TO<br>SUPPORT DATA<br>ANALYTICS,<br>STRUCTURAL<br>PERFORMANCE<br>ASSESSMENT AND<br>DIAGNOSTICS | CREATION OF A<br>STANDARD OF<br>TECHNOLOGICAL<br>STANDARDS | IMPROVEMENT OF<br>DATA COLLECTION<br>OF MATERIAL<br>BEHAVIOUR | IMPROVEMENT OF<br>RISK EVALUATION<br>AND RISK<br>MANAGEMENT | POTENTIAL<br>REDUCTION IN THE<br>FAILURE RATE OF<br>INFRASTRUCTURE | MODERN DIGITAL<br>SYSTEM FOR ASSET<br>MANAGEMENT | REDUCED<br>MAINTENANCE<br>AND<br>INFRASTRUCTURI<br>COSTS |
|              |  | MINIMUM RELIABILITY REQUIREMENTS AND<br>REFERENCE PERIOD           | •   |   |  |   | •   |  |  |  |  |  |   |   |  |  |  |
|              | PIC  | LIMIT STATE CONDITIONS   |   |   |  |   |   | •  | •  |  |  |  |   |   |  |  |  |
|              | 10   | DETERIORATION AND DAMAGE   |   |   |  | •   | •   |  | •  | •  | •  | •  | •   |   |  |  |  |
|              |  | USE OF STRUCTURE-SPECIFIC INFORMATION<br>FOR SAFETY ASSESSMENT     |   |   |  | • •   | •   |  | •  | •  | •  |  | •   |   |  | •  |  |
|              |  | -  |   |   |  | •   | •   | •  | •  |  |  |  | •   |   |  | •  | •  |

**STANDARDS** Topics

= Pilot tasks







b

### **Pilot Projects** Worked example n.2

### FURTHER AMENDMENT TO THE EXISTING EU STANDARDS ON SAFETY ASSESSMENT TAKING INTO ACCOUNT INSPECTIONS, MONITORING AND TESTING



IM-SAFE\_BriDISA Pilot Data-informed safety assessment of a prestressed concrete bridge







## **Mandate draft objectives**













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Worked Example





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### **Pilot Projects** Worked example n.3

NEW STANDARD ON CONDITION-BASED AND RISK-BASED MAINTENANCE OF TRANSPORT INFRASTRUCTURES





Select the STANDARD TOPIC (1 or multiple) object of the pilot project:

- CLASSIFICATION OF HAZARDS AND VULNERABLE ELEMENTS OF BRIDGES AND TUNNELS
- CONDITION-BASED DECISION PROCESS REGARDING INSPECTION AND MAINTENANCE
- RISK-BASED DECISION PROCESS REGARDING INSPECTION AND MAINTENANCE
- PERFORMANCE ASSESSMENT OF THE TRANSPORT INFRASTRUCTURE NETWORK
- THROUGH-LIFE MANAGEMENT DOCUMENTATION

Set the WORKING GROUP – representatives of the stakeholders (1 or multiple) :

ASSET OWNERS AND SUPPLIERS OF FINANCIAL SERVICES

Set FINANCIAL PLAN, TOOLS, TIMELINE

as a function of the OBJECTIVES

ASSET MANAGERS

ЗШ З

- ENGINEERING COMPANIES
- BUILDING COMPANIES
- SUPPLIERS OF SERVICES
- SUPPLIERS OF MATERIALS





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### **Pilot Projects** Worked example n.2

### NEW STANDARD ON CONDITION-BASED AND RISK-BASED MAINTENANCE OF TRANSPORT INFRASTRUCTURES

objectives from SWOT analysis

|   |                   | Stakeholders   |  |                                   |   |   |   | 005000000                      | <i>Jioni</i> 300                        | er analysi                           | 5 |  |  |   |  |   |  |
|---|-------------------|--|--|-----------------------------------|---|---|---|--------------------------------|---|--------------------------------------|---|--|--|---|--|---|--|
|   | ASSET C<br>FINANC | WNERS AND SUPPLIERS OF IN IT INTITICIALITIES ANTITICUS ILLIARE ANTITICUS ILLIARE ANTITICUS |  |                                   |   |   |   |                                |   |                                      |   |  |  |   |  |   |  |
|   | ASSET N           | MANAGERS   |  |                                   |   |   |   |                                |   | NUTICO                               |   |  |  |   |  |   |  |
|   | ENGINE            | ERING COMPANIES  | OPPORTUNITIES  |                                   |   |   |   |                                |   |                                      |   |  |  |   |  |   |  |
| SUPPLIERS OF TECHNOLOGIES                                       |                   | RS OF TECHNOLOGIES   |  |                                   |   |   |   |                                | INCREASED LEVEL OF GOOD ASSET           |                                      |   | OPPORTUNITY TO<br>SIMULATE THE<br>INTRODUCTION OF<br>TECHNOLOGICAL<br>IMPROVEMENTS | AUTOMATION WITH<br>TECHNOLOGY OF<br>MAINTENANCE<br>TASKS | AUTOMATION WITH<br>H TECHNOLOGY OF THE<br>MOST REPETITIVE<br>MAINTENANCE TASKS<br>(I.E. MONTHLY DRONE | ENHANCED TOOLS<br>AND GUIDANCE<br>AVAILABLE TO<br>SUPPORT<br>MAINTENANCE | REDUCTION OF<br>COSTS AND<br>INCREASE OF<br>MARGINS |  |
| SUPPLIERS OF MATERIALS SUPPLIERS OF SERVICES BUILDING COMPANIES |                   | IMPROVED HIGH-LEVEL<br>DECISION MAKING   | IMPROVEMENT OF<br>RISK EVALUATION AND<br>RISK MANAGEMENT | COST REDUCTION IN                 | AVOID RECENT<br>CATASTROPHES<br>DUE TO LACK OF<br>MAINTENANCE | REDUCED<br>MAINTENANCE AND<br>INFRASTRUCTURE<br>COSTS | POTENTIAL REDUCTION<br>IN THE FAILURE RATE<br>OF INFRASTRUCTURE | KNOWLEDGE ON THE<br>STRUCTURAL | SYSTEM FOR THE<br>EASIER IDENTIFICATION | PRIORITIZE<br>MAINTENANCE<br>BUDGETS |   |  |  |   |  |   |  |
|   |                   |  |  | MAINTENANCE AND<br>INFRASTRUCTURE |   |   |   | PERFORMANCE,<br>STRUCTURAL     | OF WHICH OBJECTS SHOULD BE              |                                      |   |  |  |   |  |   |  |
|   |                   |  |  |                                   |   |   |   |                                | SAFETY ASSESSMENT                       | PRIORITIZED FOR<br>MAINTENANCE       |   | OPERATIONS   |  | SWARM).   | OPTIMIZATION   |   |  |
|   |                   | CLASSIFICATION OF HAZARDS AND VULNERABLE<br>ELEMENTS OF BRIDGES AND TUNNELS  | • • •  |                                   |   |   |   |                                | ٠                                       | • •                                  | ۲ | •  | •  |   | ••   |   |  |
|   |                   | CONDITION-BASED DECISION PROCESS REGARDING<br>INSPECTION AND MAINTENANCE   | •••  |                                   | •   |   |   | •                              | •                                       | • •                                  | • | •  | •  |   | •  |   |  |
|   | TOPIC             | RISK-BASED DECISION PROCESS REGARDING<br>INSPECTION AND MAINTENANCE  | •••  |                                   |   |   |   | •                              | •                                       | • •                                  |   | •  | •  |   | •  |   |  |
|   |                   | PERFORMANCE ASSESSMENT OF THE TRANSPORT<br>INFRASTRUCTURE NETWORK  |  |                                   |   |   |   |                                | •                                       |                                      |   |  |  |   |  |   |  |
|   |                   | THROUGH-LIFE MANAGEMENT DOCUMENTATION  |  |                                   |   |   |   |                                | •                                       |                                      |   | • • •  | •  | • •   | • • •  |   |  |

objec



= Pilot tasks





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### **Pilot Projects** Worked example n.3

NEW STANDARD ON CONDITION-BASED AND RISK-BASED MAINTENANCE OF TRANSPORT INFRASTRUCTURES



IM-SAFE\_BriRBF Pilot Risk-based framework for the maintenance of a prestressed concrete bridge







# **Conclusions:**

- The IM-SAFE Project provides guidance on the setup of pilot projects and recommendations for the follow-up upscaling to support the practical application of the 3 new standards on:
  - structural monitoring
  - data-informed safety assessment
  - preventive maintenance in real-world cases.
- A Pilot Project template has been developed and will be made available to support implementation
- N.3 Pilot Projects as worked examples have been detailed





# > Thank you for your attention

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