

# JCSS

Joint Committee  
on Structural Safety

## Workshop on Assessment of Existing Structures

28<sup>th</sup> and 29<sup>th</sup> January 2021

Standardization for Assessment Existing Structures

The European Approach

Paul Lüchinger

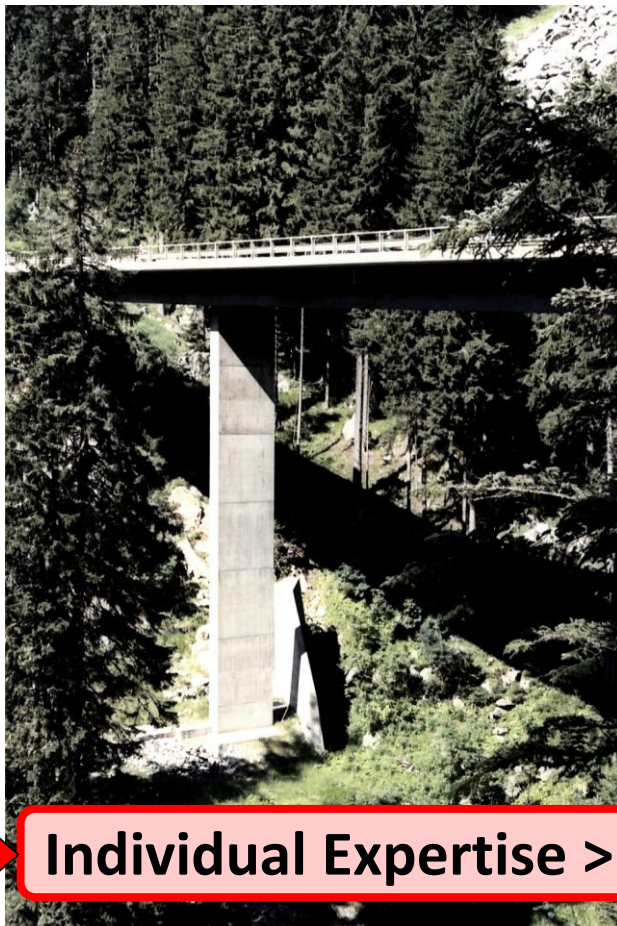
**Dr. Lüchinger+Meyer Bauingenieure AG**

# ACCESS TO ASSESSMENT

- Implementation of new generation of Structural Design Codes
- Differentiation of Limit-States
- Turning away from deterministic to reliability based methods
- However, what about Existing Structures?



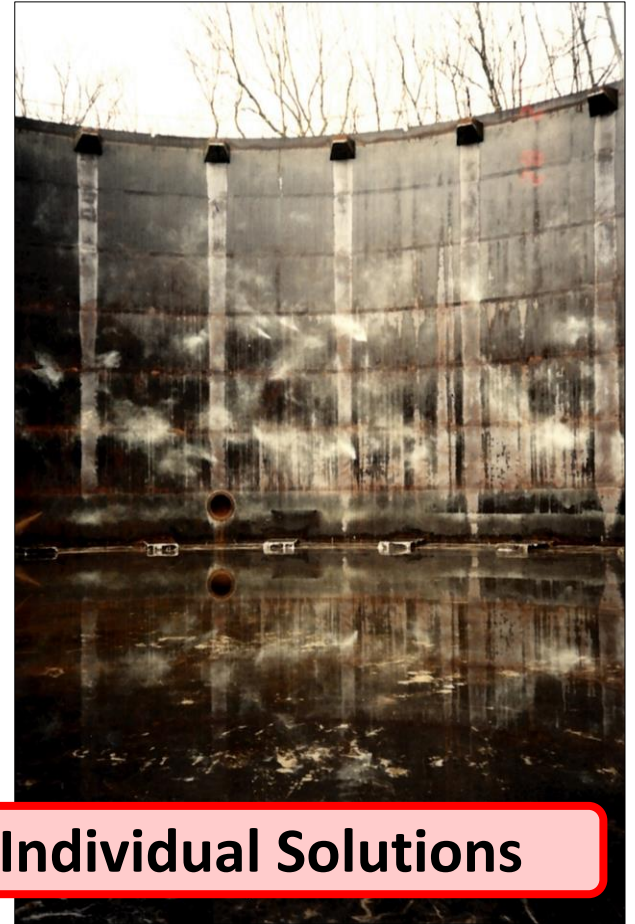
# EXPERIENCE WITH ASSESSMENT BRIDGES IN EARLY 90<sup>ties</sup>




➔ **Individual Expertise > Individual Solutions**

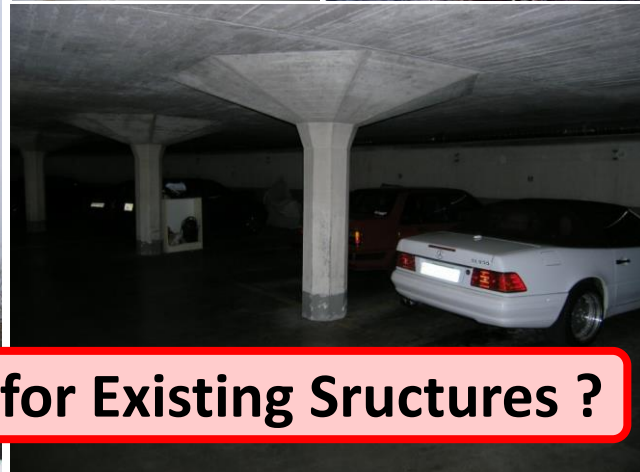


# EXPERIENCE WITH WASTEWATER PLANT IN EARLY 90ties



 **Individual Expertise > Individual Solutions**

# EXPERIENCE WITH BUILDINGS IN THE LATE 90<sup>ties</sup>



**→ Are the Desing Codes sufficient for Existing Sructures ?**

# SWISS NATIONAL APPROACH

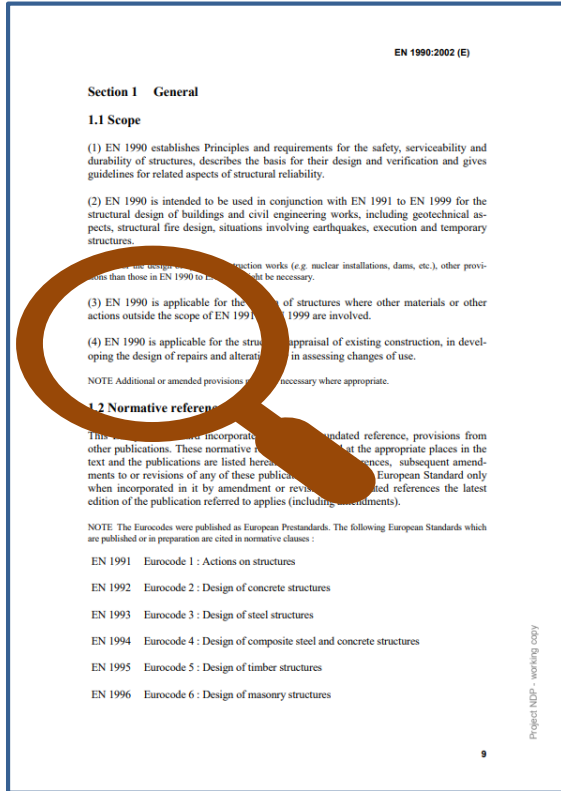


Guidelines SIA 462:1994

Appraisal of Structural Safety of Existing Structures

# EUROPEAN APPROACH ?


## SCOPE OF EN EUROCODE 1990 : 2002



**(4) EN 1990 is applicable for the structural appraisal of existing construction, in developing the design of repairs and alterations or in assessing changes of use.**

**NOTE: Additional or amended provisions might be necessary where appropriate.**

# CEN/TC250 INITIATIVE : 2009

- In view of lack of specific rules CEN/TC250 has taken the **initiative to prepare additional Technical Rules for the Assessment of Existing Structures.**
- Reflecting the continuous discussions in CEN/TC250 to **form the Working Group CEN/TC250/WG2** to develop the work item (2009).
- **To proceed step by step:**                      *see next* 



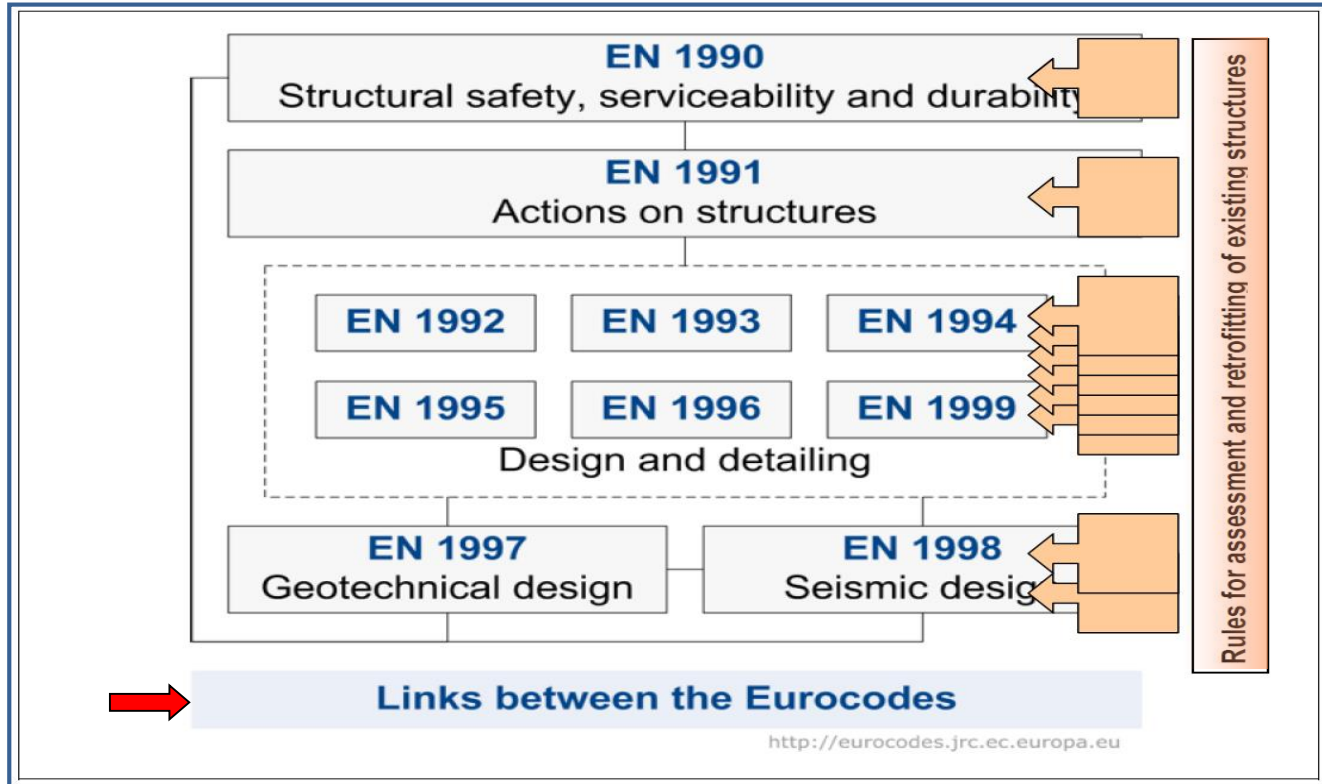
# STEPWISE PROCEDURE

**Preparation of a prenormative report**

**Preparation and publication of CEN Technical Specifications (previously known as ENV)**

**After a period for trial use and commenting, CEN/TC250 will decide whether the CEN/TS should be converted into Eurocode Parts.**

# COMPLEMENTING THE EUROCODES

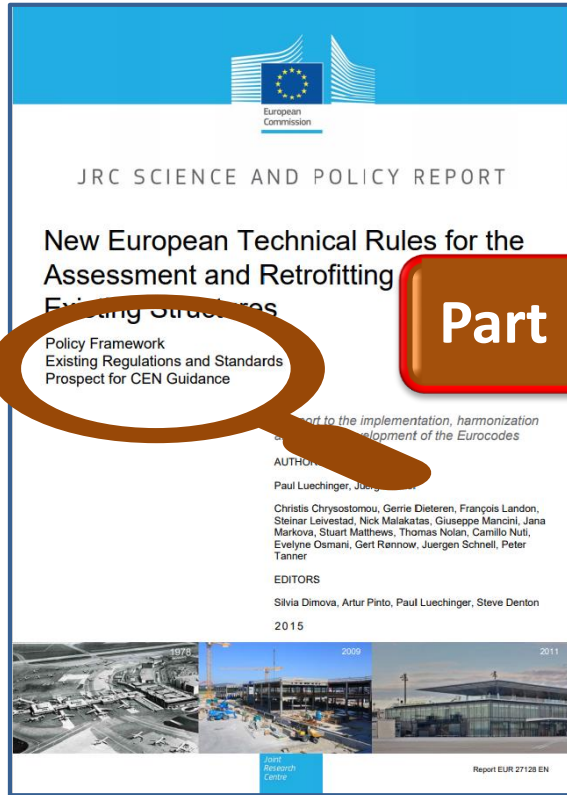


# POLICY FRAME

- Standardisation plays an important role in the industrial policy.
- It was recognized that the adoption of EN Eurocodes improve the competition in the construction sector
- DG ENTR issued a Programming Mandate to CEN to initiate the further evolution of the Eurocode system.

**In this context DG ENTR has validated the purpose to develop New European Technical Rules for the Assessment of Existing Structures with high priority.**

# JRC SCIENCE AND POLICY REPORT : 2015



## Part II: Existing Regulations and Standards ?

As platform for the publication of the prenormative document CEN/TC250 has chosen the series of “JRC Science and Policy Reports”



# EXISTING NATIONAL REGULATIONS

- **Part II of the JRC Report reflects the result of an enquiry about existing National Regulations and Standards.**
- Contact with all 22 CEN Member States >>> Feedback received from 12 Member States.

**The wide range of different approaches confirmed the need for further work to achieve a harmonized European view on the assessment and retrofitting existing structures**

# NWI MANDATE M/515 PHASE 1

- Describe the basis for the assessment and retrofitting of existing structures.
- Align with all relevant principles and requirements of EN 1990.
- Are applicable to structures within the scope of EN 1992 to EN 1999.
- **Do not include recommendations on when assessments should be undertaken.**
- **Do not cover assessment and retrofitting of existing structures subject to seismic actions, which is the subject of EN 1998-3.**

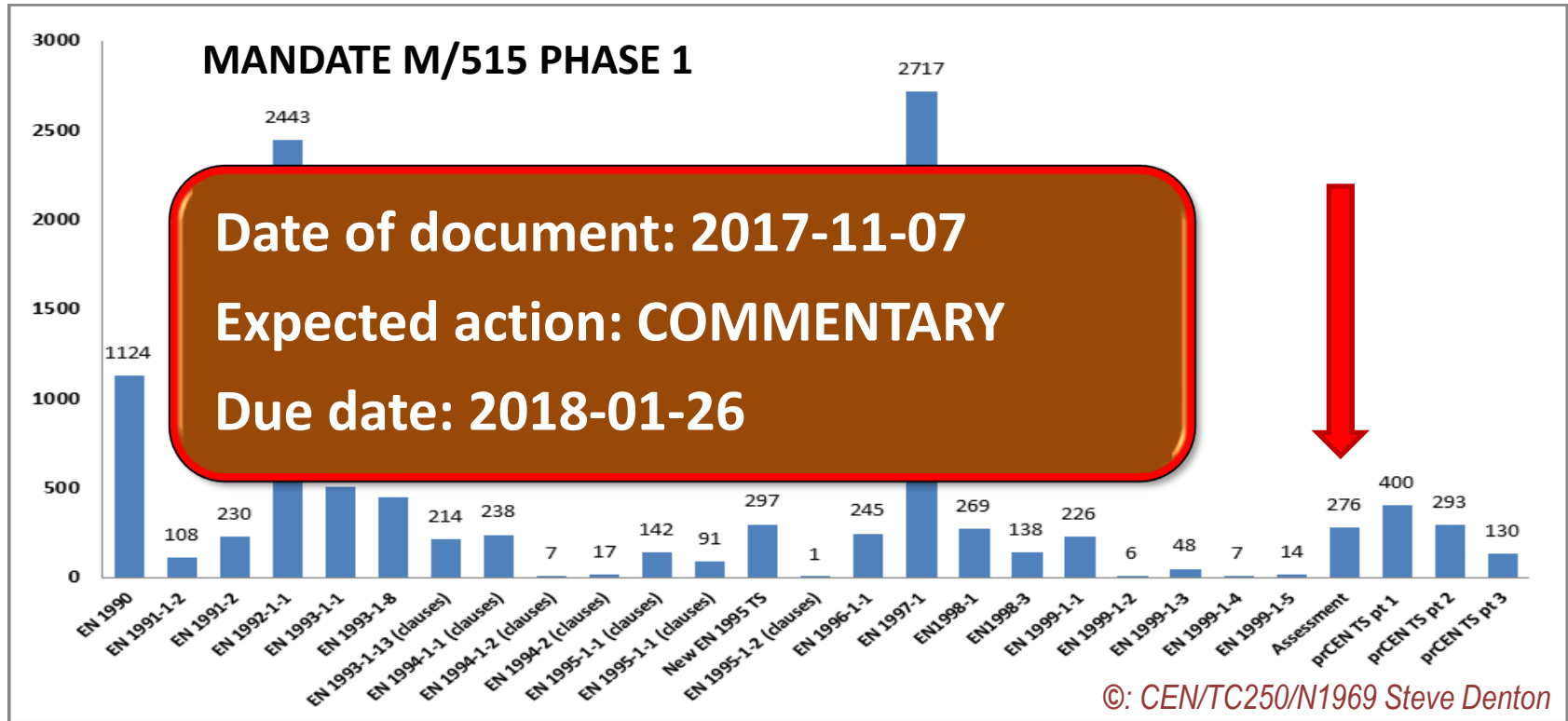
# WG2.T1 WORK PROGRAMME

09-2015

04-2018

year	2015											2016												2017												2018																										
month	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November															
month number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47															
<b>Preparation</b>																																																														
Start of the Project (Jan 1st 2015)																																																														
Preparation for Call for experts	█	█	█																																																											
Publication of the call for experts				█	█																																																									
Call for Experts				█	█																																																									
Deadline for applications (May 25th 2015)																																																														
PT Assessments (preselection teams)																																																														
Final Assessment (July 14th 2015)																																																														
Approval by EC/EFTA on PTs (Aug 14th 2015)																																																														
Start of the Project Team(s)																																																														
End of the Project Team(s)																																																														
<b>Administrative (note: Important for PTs)</b>																																																														
Progress report by PT																																																														
Half yearly progress report including latest (as-is) draft(s) by PT																																																														
PT Invoicing of prefinancing																																																														
PT Invoicing of travel and labour costs																																																														
Preparation of consolidated report to EC/EFTA by TC250 mgt. group																																																														
external audit of consolidated report to EC/EFTA																																																														
deadline submission of report to EC/EFTA by NEN and CEN																																																														
EC/EFTA assessment of consolidated report																																																														
<b>Task specific (the schedule represents the deadlines for these tasks)</b>																																																														
<b>WG2.T1b Assessment and Retrofitting of Existing Structures - General Rules / Actions - Preparation of CEN TS</b>																																																														
Start of the Project Team																																																														
Preparation of first Draft by PT																																																														
Preparation of background document(s) by PT																																																														
Delivery of first Draft by PT to NEN																																																														
Review of first Draft by SC or WG																																																														
Preparation of Second Draft by PT, taking into account comments from SC or WG																																																														
Delivery of second draft by PT to NEN																																																														
review by SC or WG																																																														
Preparation of Final Draft by PT, taking into account comments from SC or WG																																																														
Delivery of Final Draft by PT to NEN																																																														
Commenting period for NSBs (Enquiry)																																																														
Preparation of Final document by PT, taking into account comments from NSBs																																																														
Delivery of Background document(s) by PT to NEN																																																														
Delivery of Final document by PT to NEN																																																														
End of the Project Team																																																														

# PRELIMINARY INFORMAL ENQUIRY





# NSB COMMENTS ON ENQUIRY (2017)

- The main objective of the informal enquiry was to seek the National positions to WG2.T1 Final Doc. TS.

**Once more, the informal enquiry has demonstrated that the comments often have been driven in opposite directions.**

- Therefore, it was delicate task to find a balance the different methods and needs for the daily work as well for more sophisticated approaches

# WG2.T1 DELIVERIES (2018)

## **N2138 WG2.T1 FIN DOC TS: Final Document TS**

N2139 WG2.T1 FIN BGD TS: Background Documents

N2140 WG2.T1 FIN RTC TS: Comments and Observations  
(Project Team's Answers to National comments received in the context of the informal enquiry)

N2141 WG2.T1 FIN NDP TS: List of clauses indicating NDPs

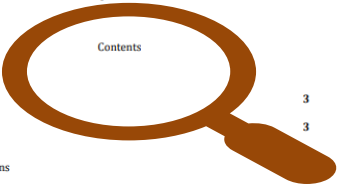
# WG2.T1 FIN DOC TS: CONTENTS

M515 WG2.T1

**Assessment of Existing Structures**

Final Document TS  
April 2018

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1. General
  2. General Requirements
  3. General framework of assessment
  4. Basic variables and updating
  5. Structural analysis
  6. Verifications
  7. Assessment based on satisfactory past performance
  8. Interventions
- Annexes

## 6 Verification

### 6.1 General

(1)P The assessment of an existing structure shall be based on the verification of ultimate limit states and serviceability limit states.



*NOTE Methods used for the verification of serviceability limit states and for the assessment based on past performance or the assessment of obsolete materials and construction forms, which cannot be assessed using limit state principles, can be set by the National Annex for use in a country.*

(2)P The assessment of existing structures shall take into account the actual conditions and circumstances of a structure and its remaining working life.

(3)P Where relevant, the influences of deterioration and defects on the ultimate resistance, deformation capacity and action effects shall be taken into account.



### 6.2 Verification methods

(1)P The actual reliability of a structure shall be verified

- semi-probabilistic methods:
  - partial factor method;
  - assessment value method;
- probabilistic method;
- direct assessment method.

*NOTE Application of the above mentioned methods for the assessment of an existing structure can be set by the National Annex for use in a country.*

(2) The assessment of existing structures should initially be carried out using the partial factor method.

***NOTE Application of the above mentioned methods for the assessment of an existing structure can be set by the National Annex for use in a country.***



# HANDOVER TO THOMAS LANG FABRIZIO PALMISANO

- Although the comments on the PT-Draft have been controversial a positive progress is to recognise in finding consensus.
- The CEN/TS is the appropriate format to achieve progress with the stepwise procedure

*Preparation of a prenormative report* ✓

*Preparation and publication of CEN Technical Specifications (previously known as ENV)*

*After a period for trial use and commenting, CEN/TC250 will decide whether the CEN/TS should be converted into Eurocode Parts.*



THANKS TO  
EVERYBODY

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