

# CONTENTS

Foreword	iv
<b>1 Introduction</b>	<b>1</b>
<b>2 Purpose of the study</b>	<b>2</b>
<b>3 Reasons for failure of prestressing steel</b>	<b>3</b>
<b>4 Severe failure cases in structures</b>	<b>6</b>
4.1 Failures not related to prestressed concrete	7
- Indoor swimming pool in Uster/Switzerland	7
- Bridge over the Inn river in Kufstein/Austria	8
4.2 Failures due to planning and execution errors	9
- Flyover at Heerdter crossing in Düsseldorf / Germany	9
- Flyover junction in Berlin-Schmargendorf / Germany	11
- Congress Hall in Berlin / Germany	12
- Bridge construction at a motorway crossing at South Nuremberg / Germany	15
- Bridge over the Muckbachtal (motorway Würzburg – Heilbronn / Germany)	17
- Prestressed Portland cement concrete slabs over cattle stables	19
4.3 Failures due to use of unsuitable construction materials	21
4.3.1 Concrete, injection grout	21
- Structures manufactured using high-alumina cement	21
- Railway overpass in Berghausen (Karlsruhe / Germany)	23
4.3.2 Prestressing steel	24
- Structures manufactured using hot rolled prestressing steel St 110/135	25
- Structures manufactured using quenched and tempered prestressing steel of older type (laboratory building in Mannheim/Germany)	26
- Structures manufactured using quenched and tempered prestressing steel of new type (production hall in Schrobenhausen/Germany)	29
<b>5 Technical corrosion characteristics of prestressing steel</b>	<b>31</b>
<b>6 Summary</b>	<b>39</b>
<b>References</b>	<b>42</b>