In recent years, rail transport in Poland, and in the world, has undergone dynamic development. Numerous large investments are being carried out, involving insufficient number of competent, experienced workers, and new contractors, and haste, which may translate into poor quality of the work and low safety level. At the same time, growing emphasis on risk analysis is present in railway transport, ultimately aiming at increasing rail safety performance. However, the risk analyses required by law are frequently limited to the impact on railway traffic safety and do not include the use of the risk analyses for supervising appropriate implementation of railway investments, especially since there are no methods in this respect that take into account the specificity of the rail traffic control systems, the impact of which on safety is particularly significant. Therefore, this work presents original proprietary method and tool that can be utilized to support investment processes conducted by the rail traffic control industry and to increase the safety of the investments, including rail traffic safety to the extent that it depends on the investments.

The doctoral thesis covers issues related to risk analyses, indicating factors and circumstances causing risks. Available risk assessment methods, which support both safety impact analyses, and risk evaluation of the investments involving railway traffic control systems are also presented. Dissertation also discusses criteria and conditions influencing selection of an appropriate method for the proper assessment of the future effects of investment-related decisions. It focuses mainly on identification and analysis of the risk factors, which are the basis for the creation of the control charts and software tool, that can be used for risk analyses during investment projects' implementation risks assessments. Own proprietary method has been presented, which allows to isolate single input variables and determine to what extent they influence safety and efficiency of the investment being analysed.

The scope of the dissertation covers topics described in nine chapters. The first part of the work (chapter 1) presents the aim and the scope of the work, as well as identification of the research problem. Then (chapters 2 and 3), a short description of railway investments in Poland together with advancement of selected investments are presented. Also in these chapters numerous issues related to risks and risk analyses methods that are used to support investment processes as well as selected risk management issues are presented.

The following chapters (chapters 4, 5) describe results of surveys and workshop meetings that were conducted with designers and manufacturers of traffic control systems. Criteria and weights for individual risks were defined, broken down into stakeholders and investment stages. Chapter 6 contains description of the original proprietary risk analysis method and the designed software tool that will be used to eliminate the risk at various stages of the railway investments. Chapters 7 and 8 describe implementation of the method and its verification by using the designed tool for analysing and supporting four investment processes at the design stage.

Original author's method presented in the dissertation supports investment processes in terms of detecting possible hazards, which translates into increase of the safety level of investments. Method and software tool verification results have already confirmed effectiveness of the proposed and detailed method.

Last part of the work (chapter 9) contains summary with conclusions and directions foreseen for further research