The comprehensive pedagogical approach of CDIO is designed to meet the current and future requirements for engineering education. CDIO integrates the disciplinary technical knowledge and the professional engineering skills required in order to operate as an engineer in industry. Accordingly, professional engineering skills need to be included in the syllabus of engineering courses and study programs, which in turn call for the implementation of learning objectives, teaching activities as well as methods for assessing the professional performance of the engineering students. The implicit and intangible characteristics of professional skills, in comparison to the traditional disciplinary technical knowledge, require teaching activities, as well as assessment methods, that adapt to the nature and learning processes of these skills. Besides, university professors do not always have profound real life experience from industry and consequently, they might have limited knowledge about professional skills which of course delimits their ability to evaluate the students’ professional performance. The objective of this study is to design and test a method to assess professional skills in an engineering teaching context. A suggested approach, based on the three consecutive steps of Define – Monitor – Assess, was applied and tested in an engineering course in which the students and professional engineers from industry interacted in an extensive role play simulation. The students’ were actively involved in the three steps of defining the professional skills criteria, monitoring and documenting their professional performance on basis of direct feedback from the professional engineers and finally, assessing their learning process. The study concludes that the suggested approach is applicable in the assessment of professional skills with reference to a good alignment between the teaching activity of role playing and the assessment, the formative feedback from professional engineers monitoring the learning process and the realistic context provided by the location of the role play at the office premises of the respective professional engineers involved in the course.