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Reasons for change orders in construction projects: Salah al-Din Governorate as a Case study

Ensaf Raad Abood[1*], Abdulrahman Adnan Ibrahim[2]

1-College of Engineering, Department of Civil Engineering, University of Tikrit, Tikrit, Iraq
2-College of Engineering Department of Civil Engineering, University of Tikrit, Tikrit, Iraq

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Corresponding Author

E-mail: **ensaf.civil3300@gmail.com**
Mobile: 07719995179

Abstract

This research aims to find a computer program through which the reasons for change orders that occur in projects are determined as a modern and effective method for application. It is also aimed to be used in future projects with the aim of reducing the cost and time of project completion and achieving financial savings in addition to maintaining the quality of the project. As this program, which was designed by using C# (C sharp) programming language and operating in the (Visual Basic) environment, is based on real data collected through 21 projects related to health and road projects in different cities and regions of Salah al-Din Governorate. After conducting the statistical analysis, these results were included in the program and classified according to the importance factor of each item. After designing the program and preparing a questionnaire to evaluate the program by 15 engineers working in the health and road sectors, one of the important conclusions reached was that the practical benefit of the program in future projects was very good, at a rate of 80% based on these engineers' assessments and that the program helps in eliminating or reducing change orders was excellent, at a rate of 73.3%. Based on user feedback, it can be concluded that the overall evaluation of the program was very good.

Introduction:

Although the world is witnessing a large construction movement, the implementation of projects faces several problems. Including changes that occur during project implementation, these changes are considered a feature of projects for several reasons; including the fact that these implemented projects take a very long time to implement. It may lead to a change in certain specifications, the introduction of new ideas, or the development of a certain technology [1]. This change needs to be managed through its account and organization using a formal contract known as a "Change or change order" that is linked to the project's initial contract [2]. The main reasons for change orders are summarized in Table (1).

In international construction contracts like FIDIC and AIA, changes in contract are typically referred to as "variations" under FIDIC and "change orders" under AIA [3]. Numerous definitions of "change" or "variation" orders, two concepts that are practically synonymous [4].

Change orders have many purposes that can be utilized in construction projects, such as mitigating conflicts between the contractor and the owner, implementing a proposal incentive reduction process for value engineering proposal adjustments, updating contract unit prices in response to specification changes, additional new tasks as needed to modify job specifications, including payment terms and contract timelines as required, and adjusting the contract plan with specified payment methods [5].

The potentially significant impact that change orders are anticipated to occur on the original project are increased costs, schedule delays, payment delays, decreased production efficiency, strained relationships among stakeholders involved in the construction process changes in one project may impact other unrelated projects by utilizing resources allocated to other projects, compromised quality of work, work suspension for other project tasks, and requirements for demolition and renovation [6, 7].

Classifications of changes in general terms apply to changes in the construction sector " Based on time", changes can either be anticipated or emergent, reactive or proactive or occur before site identification or after it. "Based on need", changes can be elective or required, or preferential or regulatory. "Based on effect", changes can be positive, neutral, or negative [8]. In that sequence, the project owner, consulting engineers, the contractor, and other outside conditions were the first to request the suspension of modification orders [9]. To prevent having to submit a change order, the project's design and planning phase needs to be given careful consideration. This includes clearly defining the owner's requirements to prevent errors and quantity shortages during the implementation phase, which could result in the need for additional work or the demolition of completed work, increasing project costs and delays. Disagreements may also lead to more work requests. Effective cooperation between all stakeholders and project engineers from all fields (civil, architectural, electrical, and mechanical) achieves this [2].

In construction projects, there is no modern and acceptable method for reducing or eliminating change orders. Therefore, the purpose of this paper is to create a computer program to determine the fundamental reasons that stand behind the change orders. The data used in this computer program was obtained through statistical analysis of real data collected from roads projects and health clinics in Salah al-Din Governorate.

Numerous academics have studied change orders in different countries. For example, [10], in Algeria a research studied the causes of schedule delays in construction projects to identify the reasons for delays in implementing projects. The authors found that the reasons related to the owner are the most important reasons that lead to the occurrence of change orders, for example, the unreasonable project duration, delays in the payment process, and unavailability of equipment. [11] describes the causes of change orders and their effects on the cost and time of projects in Sulaimani Governorate, the most important reasons for change orders that occur is the financial difficulty for the owner and the profitability of the contractor. Errors and omissions in the design, in addition to preparing typical designs for various regions in Sulaymaniyah Governorate. This results in a cost increase of 20% of the original cost and a 65.4% increase in project implementation time. [12] studied the causes influencing the occurrence of change orders in the construction of buildings, the authors concluded that other reasons cause the occurrence of change orders in the project, including the technical necessity to change the specifications for the benefit of the project. The authors also concluded that inaccuracy in calculating

Quantities, in addition to the consultant's weak experience, is considered one of the most important reasons for change orders from the perspective of the owner and contractor. Previous research has also demonstrated that the data collection method of using questionnaires and in-person interviews yields low accuracy. As a result, it was discovered that the research addressed the issue of change orders in projects in a general and cursory manner, omitting to delve into the details of the project-specific items where change orders occurred. For this reason, this research aims to fill the knowledge gap by relying on real data from (21) projects divided as follows: (10) roads projects and (11) health clinics. Also, preparing the program involves the items of projects and parties responsible for occurring change orders.

Table 1. Reasons for Change Orders

Reasons for change orders	Reference
Owner	
A desire to get started on the project early	[13]
The owner's rigid and unyielding personality	[13]
A challenging financial circumstance	Field Survey
Change of schedule and scope of projects	[14]
Ambiguous owner specifications.	[15]
Consultant	
Insufficient consultant expertise.	Field Survey
Deficiency in the bill of quantities preparation.	Field Survey
Unawareness of available materials in the market.	[13]

Rigidity in the consultant's demeanor.	[14]
Designs	
Value engineering	[15]
Mistakes and oversights in quantity calculations.	Field Survey
Complexity level of the designs.	[14]
Inconsistency of designs with regulations	[16]
Designs failing to meet the owner’s specifications	[13]
Contractor	
Contractor work team's low productivity	[17]
Poor financial standing of the contractor	[14]
Profit-driven motives.	Field Survey
Project management	
Limited practical experience of the resident engineer.	Field Survey
Adherence to standard approval procedures for work execution.	Field Survey
Materials	
Failure of a material during laboratory testing	[16]
Modifications to the material specifications	[18]
Contract	
Ambiguous clauses in the contract terms.	[19]
Discrepancies among the contract documents.	[19]
Other	
Unexpected Occurrences.	[20]
The state of the weather	[20]

Statement and objective

It was found that projects in Iraq suffer from the frequent occurrence of change orders, which have a negative impact on project implementation, as it causes deviation from the schedule, cost, and project quality. The aim is to create a computer program to determine the fundamental reasons behind the occurrence of change orders in civil engineering projects. To achieve the implementation of civil engineering projects efficiently, at the lowest possible cost, and on time.

Research methodology

In this study, data collecting was combined with a critical analysis of the change order literature. Academic databases were searched using keywords such as reasons, computer program, roads projects, health clinics projects, change orders, and so forth. As a result, many factors, including owners, consultants, and contractors, were shown to have contributed to the creation of change orders in projects. According to findings from earlier research, questionnaires and in-person interviews are the primary methods used to gather data for projects. These methods do not provide very high accuracy, which suggests that earlier studies were skimmed over. Thus, without going into specifics, the authors used field visits to obtain real data for projects. This research utilized a variety of data collection techniques, such as field visits and literature reviews, to develop its methodology. The procedure involved several steps: first, a comprehensive review of the literature on change orders was carried out, which included a review of books and scientific journals as well as an examination of one hundred scientific papers. Second, field visits were conducted at several different institutions; third, survey data were gathered from previous projects by looking through files and documenting change orders. Final step was the design of an appropriate form. The methodology used to achieve the objectives of this study is presented in Fig.1. To prepare a closed questionnaire, real data on change orders was gathered during the data collection process from (10) road projects and (11) health clinic projects in the cities of Samarra and Tikrit. The most frequent works in these projects that involved change orders were identified by visiting pertinent institutions and reviewing files. Following the collection of data, a closed questionnaire was created to determine who was in charge of the occurrence of change orders. Two portions of a closed questionnaire were administered. Personal information such as work sector, years of experience, degree of education, and particular field of work are all included in the first section of the questionnaire. These other parts contained project items involving change orders as well as the parties such as the owner, consultant, contractor, design team, and others who were responsible for their occurrence. Both SPPS (V.26) and Excell (V.2019) were utilized by the authors for data analysis. Then, the data obtained from the statistics analysis is used to create a computer program, programmed in the (C#) programming language.

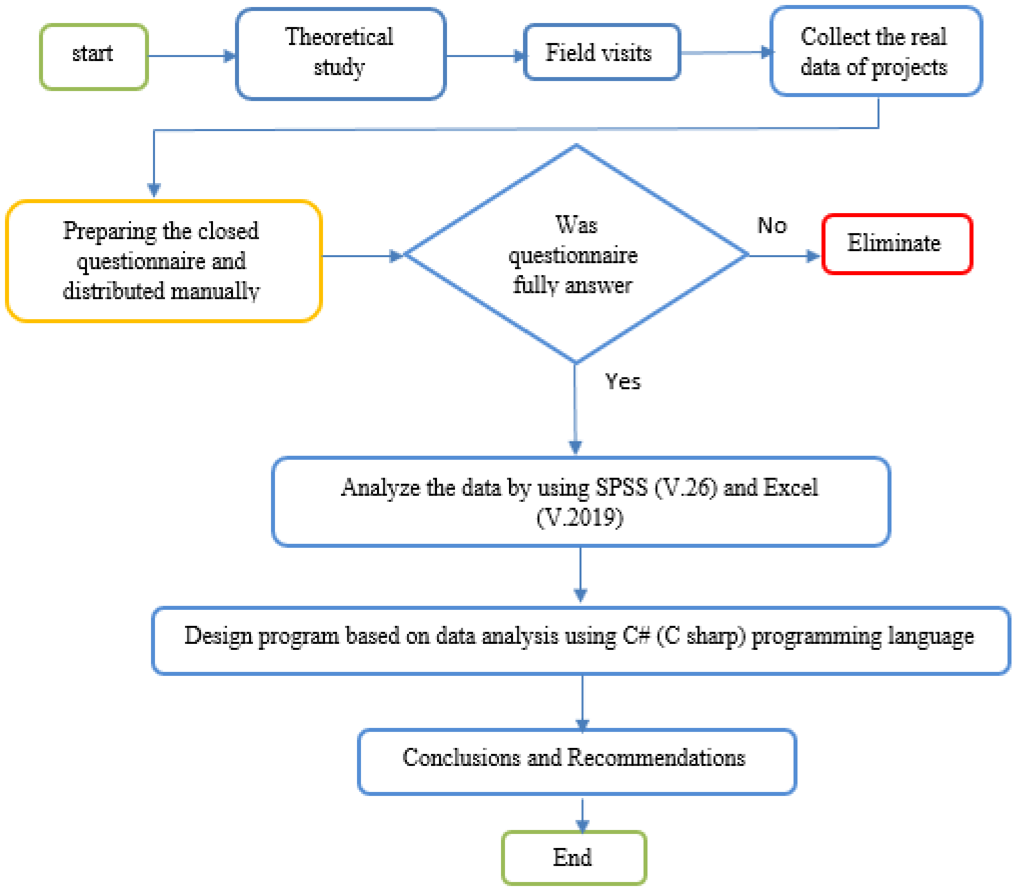

Fig.1 Methodology of the research

Sample of closed questionnaire

The study population in Iraq is made up of the following: academics, consultants, experts, engineers, contractors, and members of the public and private sectors that are specialists in their fields. In addition, there are construction-contracting firms that specialize in bridge construction projects. To gather the data required for the study, the authors took a sample of the study population and used it. Using **Equations (1) and (2)**, a statistically representative sample of the goal Hogg and Tannis (2009) was obtain.

$$n=\frac{m}{1+((m-1)/N)} \qquad (1)$$

Where the sample sizes of the available, limited and infinite populations are denoted by N, n, and m, respectively. Conversely, m is estimated using equation (2):

$$m=\frac{z^2 \times p \times (1-p)}{E^2} \qquad (2)$$

Where z is the confidence level and its value (1.95) at the level confidence 95%, p is constant have a value 0.5 and E is the sampling error of the point estimate (0.05).

Equation (2) can be used directly to find the estimated value (m) if the level of significance is set to 5% and a confidence level of 95% is used in the absence of a stated sample size.

$$m=\frac{(1.96)^2*(0.5)*(1-0.5)}{(0.05)^2}=385$$

When calculating the sample size required the entire target sample to be successful among the 80 engineers, the following equation (1) can be applied:

$$n=\frac{385}{1+(\frac{385-1}{80})}=66$$

Although the required questionnaire sample is 66, the authors were able to collect about 63 questionnaire forms. This is due to many challenges faced by the authors. One reason for this constraint was the dearth of skilled engineers in the civil engineering industry who were experts in change orders. This restriction was further exacerbated by the existence of engineers with specialized knowledge outside of civil engineering, who might not have understood the importance of these directives and how they affected project progress. **Table 2** summarizes the number of questionnaire forms.

Table 2. Number of questionnaire forms

Forms of questionnaire	Number
Required sample	66
Questionnaire forms distributed	80
Questionnaire forms received	63
Questionnaire forms subject to analysis	63

Analysis tools

The reliability of the questionnaire was assessed using the Cronbach's Alpha Coefficient approach, and the data was subjected to a normality test to ensure that the data was statistically subject to a normal distribution. The use of Excell Version 2019 and SPSS Version 26 allowed for the identification of the Parties responsible for the occurrence of change orders. The analysis included reliability analysis, means, frequency, percentages, standard deviations (S.D.), and the Relative Importance Index (RII).

Results and discussion

In this section, the authors apply the statistical concept and discussion the obtain results.

Statistical analysis of data

In order to demonstrate that scales and tests developed or utilized for research projects are appropriate for their intended application, authors frequently employ Cronbach's alpha as a statistic Taber (2018), where the reproducibility and dependability of the outcomes are referred to as reliability Hnnet (2022). As indicated in **Table.3**. The internal consistency (reliability and validity) of the questionnaire data was evaluated using Cronbach's coefficient alpha (α). And the equation of Cronbach's coefficient alpha and validity shown below:

$$\boldsymbol{\alpha} = \frac{\boldsymbol{N}}{\boldsymbol{N-1}} \times \left[\mathbf{1} - \frac{\sum_{i=1}^{k} \boldsymbol{Si^2}}{\boldsymbol{St^2}}\right] \qquad (3)$$

$$\mathbf{V} = \sqrt[2]{\boldsymbol{\alpha}} \qquad (4)$$

Where N is the number of items (factors) in a group, Si^{2} is the variance associated with the item (i), st^2 is the variance associated with the sum of all (N) item scores, V is the validity and α is Cronbach's alpha. The results indicate that the reliability of the questionnaire is outstanding, as evidenced by reliability outcomes more than 0.9, as indicated in Table 3 by Cronbach's coefficient alpha (α) and validity.

Table.3 Reliability and Validity for roads and health clinics projects

Type of Project	Number item	Reliability (Cronbach's Alpha)	Validity
Roads projects	18	0.966	0.982
Health clinics	25	0.957	0.978

In order to verify that the data is statistically subject to the normal distribution, the authors employed two tests using SPSS (V.26): The Shapiro-Wilk test and the Kolmogorov-Smirnov test. The results of the normality test for school project paragraphs are displayed in **Table. 4**. The questionnaire's results show a normal distribution with a p-value of more than 0.05 and significant values (P-value = 0.457) for health clinics and (p-value=0.102) for roads. The Q-Q plots in **Figure 2** and **Figure3**, which exhibit the results, further support the findings.

Table 4. Test of normality for projects

Test of Normality						
Type of projects	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Health clinics	.096	30	.200*	.967	30	.457
Roads projects	.185	33	.006	.946	33	.102

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

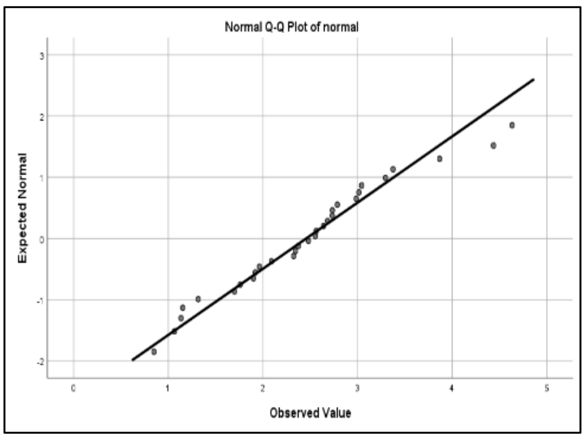

Fig. 2. Q-Q Plot for Health clinics projects

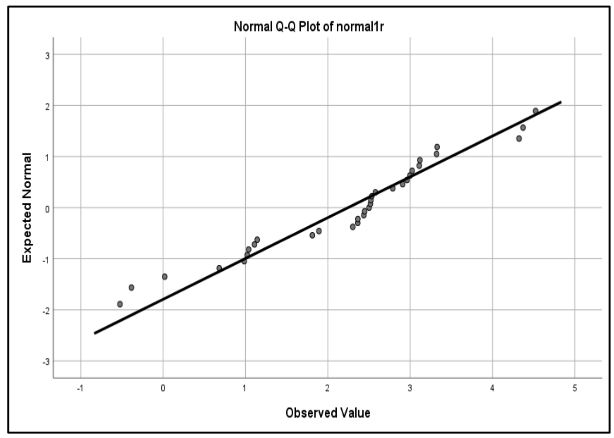

Fig. 3. Q-Q Plot for Roads projects

Descriptive statistics for items of health clinics and roads that change orders occurred

The participants were asked to provide their comments on this data, which comprised 25 items on health clinics and 18 items on roads projects with the partners that formed the basis for the change orders. The results of the analysis were shown in Table 5 and Table 6 together with descriptive statistics such as mean, standard deviations (S.D), and the Relative Importance Index (RII), based on participant grades. Based on their frequency and relative importance, the reasons were arranged in order. Project change orders were issued for a variety of reasons, with the percentages for health clinics and road projects ranging from (86.7) to (3.3%) and (57.6%) to (3.6%), respectively. It is the primary and most common cause of occurrence change orders, as indicated by the reason with the highest percentage. Table 5 indicates that the design team had a role in the occurrence of change orders in health clinics projects. In addition, it is clear from the Table 6 that in the items related to the works of adjustment and laying sub-base type B, the owner had a role in the occurrence of change orders. In contrast, the design team was in charge of any modification orders that appeared in the sections about excavation, earthworks, concrete interlocking application, asphalt, layering of stabilizer layer, concrete and street layout. The item (pouring reinforced concrete over windows, bridges, laces and roofs) had the highest RII value equal to (76%) with a mean (3.8) and S.D. (0.404). The design team was instrumental in the occurrence of change orders in it as shown in Table 5. This indicates that the pouring of reinforced concrete over diverse elements like windows, bridges, ties, and roofs signifies structural intricacy. Any alterations to these components may necessitate extensive adjustments, thereby raising the probability of change orders, and item (Digging of the strip foundation) had the highest RII value equal to (47%) with a mean (2.366) and S.D. (0.688) and the design team was instrumental in the occurrence of change orders in it. This indicates, that perhaps the requirements and specifications for strip foundation excavation have been thoroughly and comprehensively outlined since the project's inception, thus reducing the likelihood of later modifications. In Table 6, the item (Pouring ordinary concrete under the intermediate garden solid block) had the highest RII with a value (75%) with a mean (3.757) and S.D. (1.061). The design team was instrumental in the occurrence of change orders in it. This results from unexpected conditions on the site or poor quality of the materials used and inaccuracy in calculating the quantities for this item while the item (Removing the damaged asphalt) had the lowest RII with a value (65%) with a mean (2.363) and S.D. (1.084), because being a routine and necessary process for road renewal. Furthermore, the design team was instrumental in the occurrence of change orders.

Table 5. Descriptive Statistics for items of health clinics

Items	Reasons	Perce. %	Mean	S. D	RII	Rank
Digging of the strip foundation	Design team Consultant Owner	46.7 43.3 10.0	2.366	0.668	47	25
Digging of the box foundation	Consultant Design team Owner	50.0 46.7 3.3	2.433	0.568	49	24
Laying sub-base type B under DPC	Design team Consultant	70.0 30.0	3.700	0.466	74	6
Burying the flooring in clean soil	Design team Consultant Owner	73.3 23.3 3.3	3.700	0.534	74	7
Fencing works	Design team Owner Consultant	76.7 13.3 10.0	3.633	0.722	73	13
Pouring the floors with ordinary concrete	Design team Consultant Owner	83.3 13.3 3.3	3.800	0.484	76	2
pouring reinforced concrete for the foundation walls foundations using salt-resistant cement.	Design team Consultant Owner	76.7 20.0 3.3	3.766	0.520	75	5
pouring reinforced concrete over windows, bridges, laces, and roofs.	Design team Consultant Owner	83.3 13.3 3.3	3.800	0.404	76	1
pouring reinforced concrete column foundations using salt-resistant cement.	Design team Consultant Owner	80.0 16.7]3.3	3.766	0.504	75	4
pouring reinforced concrete for floors.	Design team Consultant Owner	76.7 16.7 6.7	3.700	0.595	74	8
Pouring concrete for the walls of X-ray.	Design team Consultant Owner	63.3 30.0 6.7	3.566	0.626	71	15
Construction under the DPC using type A bricks.	Design team Consultant Owner	63.3 26.7 10.0	3.566	0.681	71	16
Construction above the DPC using type B bricks.	Design team Consultant Owner	63.3 23.3 13.3	2.500	0.731	50	23
Block construction for retaining walls.	Design team Consultant Owner	80.0 10.0 10.0	3.700	0.551	74	9
Using tiles to cover floors.	Design team Owner Consultant	80.0 10.0 10.0	3.600	0.651	72	14
working of Skirting tile.	Design team Owner	76.7 13.3	3.633	0.710	73	10

Items	Reasons	Perce. %	Mean	S. D	RII	Rank
Precast concrete flag (tiles)	Design team	73.3	3.566	0.773	71	18
	Owner	16.7				
	Consultant	10.0				
wall cladding with limestone	Design team	76.7	3.633	0.718	73	11
	Owner	13.3				
	Consultant	10.0				
covering the X-ray room's walls with lead sheets	Design team	70.0	3.566	0.727	71	17
	Consultant	16.7				
	Owner	13.3				
Sealing all brickwork construction to grade A including up to the DPC with salt-resistant cement mortar.	Design team	83.3	3.410	0.639	68	19
	Owner	10.0				
	Consultant	6.7				
Painting walls	Design team	76.7	2.600	0.770	52	22
	Owner	16.7				
	Consultant	6.7				
Using gypsum for plastering	Design team	86.7	2.800	0.550	76	3
	Owner	6.7				
	Consultant	6.7				
Using sand and cement for Plastering	Design team	83.3	3.100	0.568	62	20
	Consultant	10.0				
	Owner	6.7				
Use white cement for wall plastering	Design team	80.0	2.700	0.651	54	21
	Owner	10.0				
	Consultant	10.0				

Table 6. Descriptive Statistics for items of roads projects

Items	Reasons	Perce. %	Mean	S. D	RII	Rank
Works of adjustment	Owner	39.4	3.272	1.305	65	8
	Design team	27.3				
	Consultant	18.2				
	other	9.1				
	Contractor	6.1				
Earthworks for road elevation above natural ground level	Design team	39.4	3.363	1.194	67	7
	Owner	33.3				
	Consultant	15.2				
	Contractor	6.1				
	Other	6.1				
Laying sub-base type B	Owner	36.4	2.393	1.321	48	17
	Design team	30.3				
	Consultant	15.2				
	Contractor	9.1				
Burying by clean soil	Design team	42.4	3.555	1.199	71	5
	Owner	27.3				
	Consultant	12.1				
	Contractor	12.1				
Drilling an artesian well using a drilling rig	Design team	45.5	2.393	1.143	48	16
	Owner	33.3				
	Consultant	9.1				
	Contractor	9.1				
	Other	3.0				
Excavation of pipeline route and manhole surroundings	Design team	45.5	2.484	1.007	50	11
	Owner	33.3				
	Contractor	9.1				
	Consultant	6.1				

	Other	6.1				
Construction of concrete pipe culverts	Design team	39.4	2.454	1.325	49	14
	Owner	33.3				
	Other	12.1				
	Consultant	9.1				
	Contractor	6.1				
Pouring a street using type C cement with two layers of BRC	Design team	45.5	3.620	1.167	72	4
	Owner	24.2				
	Consultant	12.1				
	Contractor	12.1				
	Other	6.1				
Pouring the foundation of the ready-made rainwater tank	Design team	51.5	3.666	1.108	73	2
	Owner	24.2				
	Contractor	15.2				
	Consultant	6.1				
	Other	3.0				
Pouring a drainage pipe network and the surroundings of manholes	Design team	45.5	2.636	1.245	53	10
	Owner	30.3				
	Contractor	15.2				
	Other	6.1				
	Consultant	3.0				
Pouring ordinary concrete under the intermediate garden solid block	Design team	57.6	3.757	1.061	75	1
	Owner	21.2				
	Contractor	15.2				
	Consultant	3.0				
	Other	3.0				
Laying a layer of stabilizer	Design team	57.6	2.454	1.033	49	13
	Owner	27.3				
	Consultant	9.1				
	Contractor	3.0				
	Other	3.0				
Laying a layer of asphalt	Design team	51.5	2.424	1.090	48	15
	Owner	30.3				
	Consultant	9.1				
	Contractor	6.1				
	Other	3.0				
Laying a layer of concrete interlocking pavers	Design team	51.5	3.515	1.175	70	6
	Owner	33.3				
	Contractor	12.1				
	Other	3.0				
Curbstone application for the middle carrot	Design team	45.5	2.484	1.227	50	12
	Owner	36.4				
	Contractor	15.2				
	Other	3.0				
Road planning with thermal dyes	Design team	54.5	3.666	1.167	73	3
	Owner	27.3				
	Contractor	9.1				
	Other	6.1				
	Consultant	3.0				
Excavation, relocation of electrical poles, and pouring of foundations	Design team	45.5	2.727	1.231	55	9
	Owner	24.2				
	Contractor	12.1				
	Consultant	9.1				
	Other	9.1				
Removing the damaged asphalt	Design team	45.5	2.363	1.084	47	18
	Owner	30.3				

Consultant	15.2
Contractor	6.1

Computer program

The purpose of the program is to determine the fundamental reasons for the occurrence the change orders in civil engineering projects (Roads Projects and Health clinics projects), as well as minimizing or completely eradicating change orders from construction projects. There were two phases involved in the creation of this program. Using an on-site survey, a real data collection and the questionnaire is part of the first. A flow chart was used to organize the information once the facts were determined. **Figure 4** shows the flow chart of program. Secondly, creating a program by using C# (C sharp) programming language and operating in the (Visual Basic) environment. When the user opens the program, its interface will appear, containing the name of the system, as shown in **Figure 5**. After the user enters the password, the window containing two entries will appear for roads projects and health clinics projects as in **Figure 6**. After the user chooses the type of projects, a window will appear to identify the items of projects. Moreover, when the user selects the item, there will be a dialog box showing the reasons of change orders in. There is another selection if the user wants another reason and this for item list, as show in **Figure 7** and **Figure 8**.

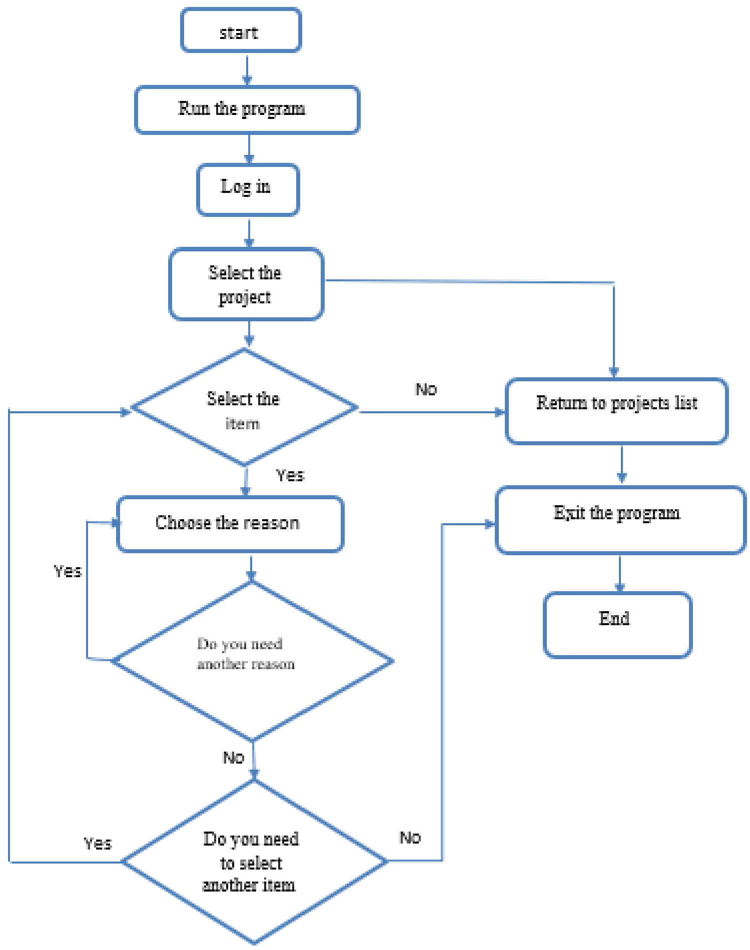

Fig. 4. Flow chart for designing a program

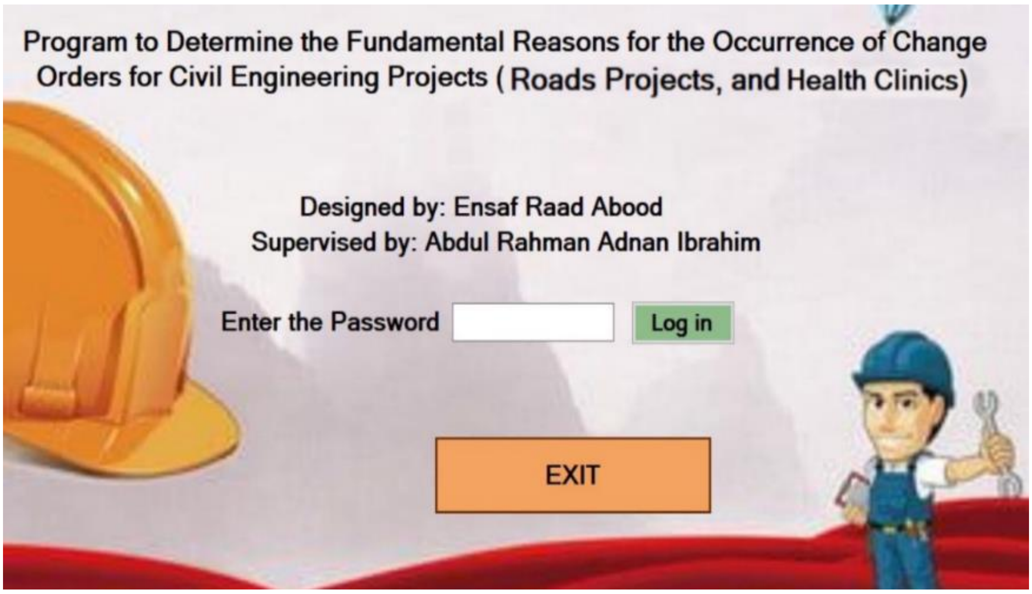

Fig. 5. A window showing the program interface

Fig. 6. A window shows two entries for roads projects and health clinics

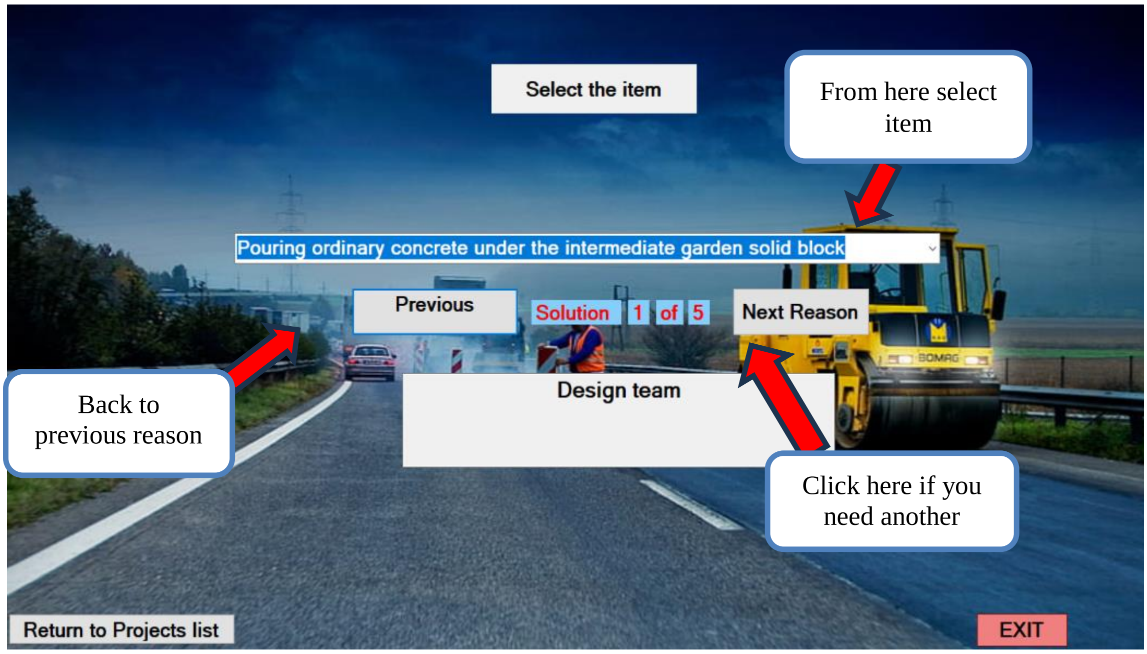

Fig. 7. A window shows the items for roads projects and the reasons for change orders.

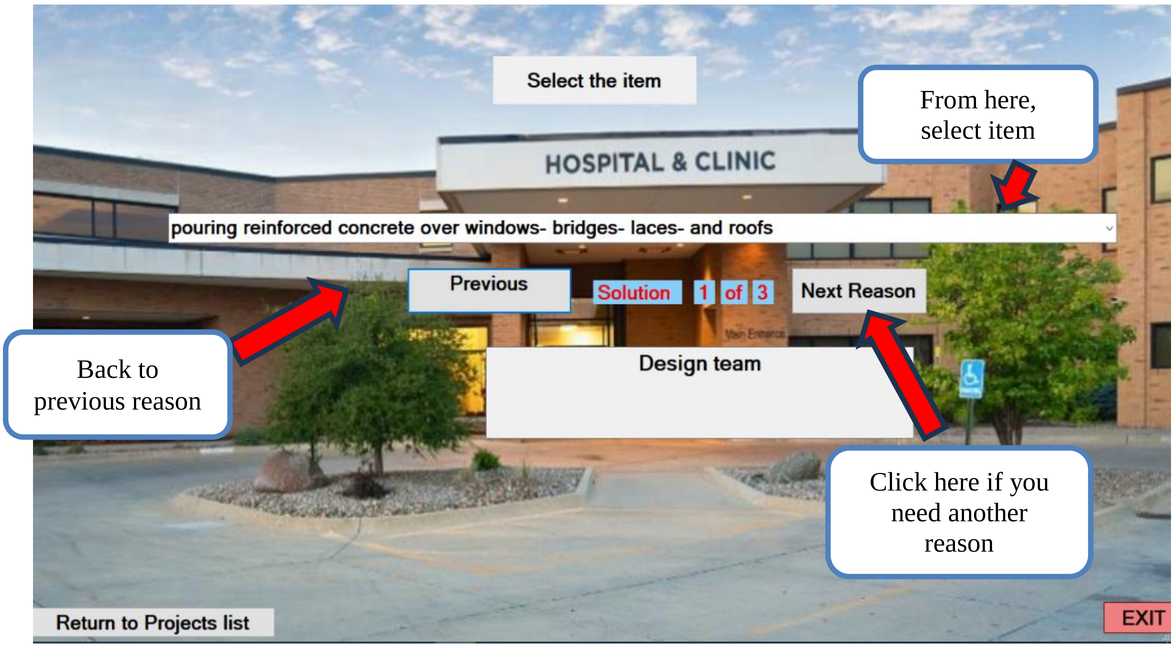

Fig. 8. A window shows the items for health clinics projects and the reasons for change orders

Conclusion

Based on the theoretical and practical aspects included in this study, the most important parts of the project in which change orders occur repeatedly were identified, along with identifying the parties responsible for the occurrence of these change orders. These results were included in a computer program as an innovative, modern and acceptable method to benefit from it in implementing construction projects without any Complexities and also ensures no delay in project implementation and maintains cost and project quality. After designing the program and preparing a questionnaire to evaluate the program by 15 engineers working in the health and road sectors, one of the important conclusions reached was that the practical benefit of the program in future projects was very good, at a rate of 80%. This the program helps in eliminating or reducing change orders was excellent, at a rate of 73.3%. Based on user feedback, it can be concluded that the overall evaluation of the program was very suitable. In addition, one of the advantages of this program is that it is considered a valuable tool for providing a high level of experience. The program includes most of the paragraphs in which change orders appear and helps in presenting the responsible party due to which the change order occurred. Avoiding the need to create the change order from the start is the simplest method to prevent the time delays brought on by change order work. This is achieved by focusing on the design phase. Moreover, through this study, it is found the most critical items that affect on implementation that had the highest value of RII are pouring reinforced concrete over windows, bridges, laces, and roofs with the value of RII (76%), pouring the floors with ordinary concrete with the value of RII (76%) and using gypsum for plastering with the value of RII (76%). The critical items that affect on roads projects that had the highest value of RII are earthworks for road elevation above natural ground level with the value of RII (67%) and works of adjustment level with the value of RII (65%).

Limitations

The research's limitations include adopting a program to determine the reasons for change orders in Roads and health clinics projects. Subsequent studies should concentrate on applying linear regression technology to control change orders in infrastructure.

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Author contributions

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Data availability

Upon request, the author can provide the data that were used during the study.

Declarations

Conflict of interest

No conflict of interest exists.

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