

## **الفصل الثاني**

### **دراسة المخاطر**

**Risks Definitions**

**Risks Identification**

**Risks from the Perspective of the main Parties in Construction**

**Qualitative Risk Analysis**

**Quantitative Risk Analysis**

**Risk Management in Construction Projects**

**Risk Management**

**Monitor & Control Risk**

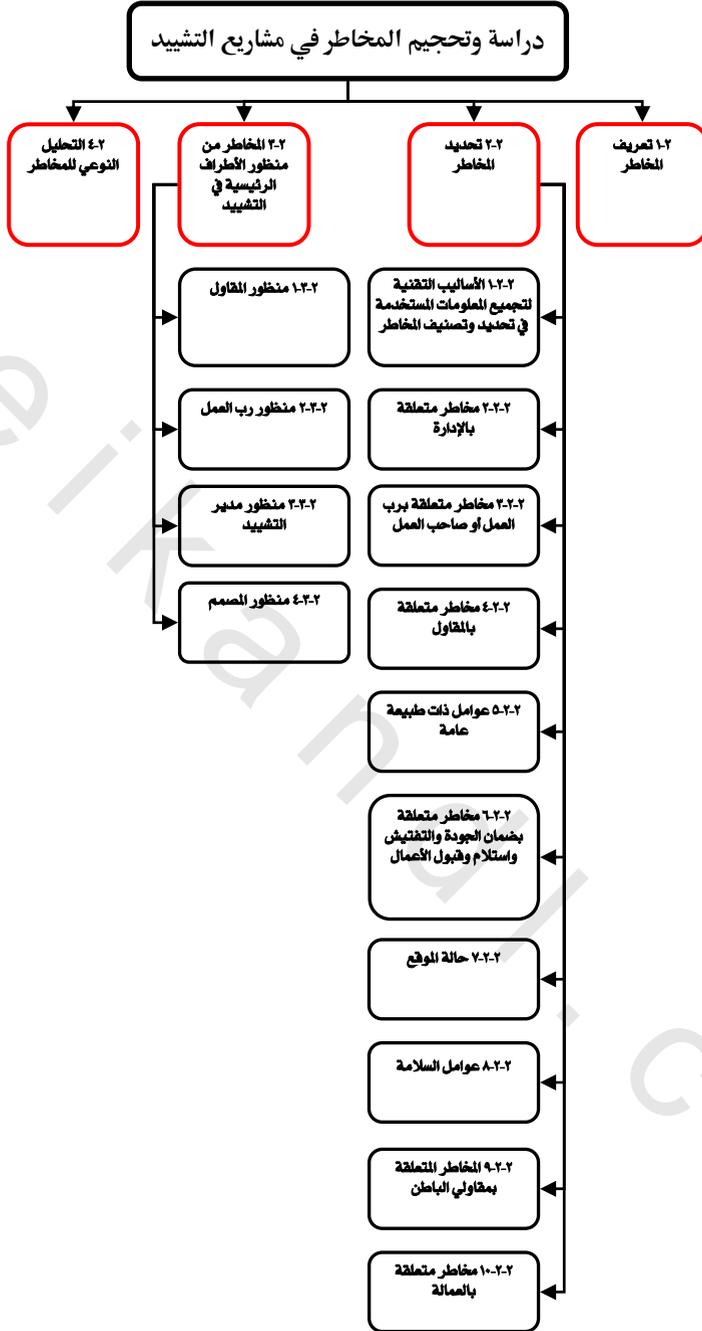
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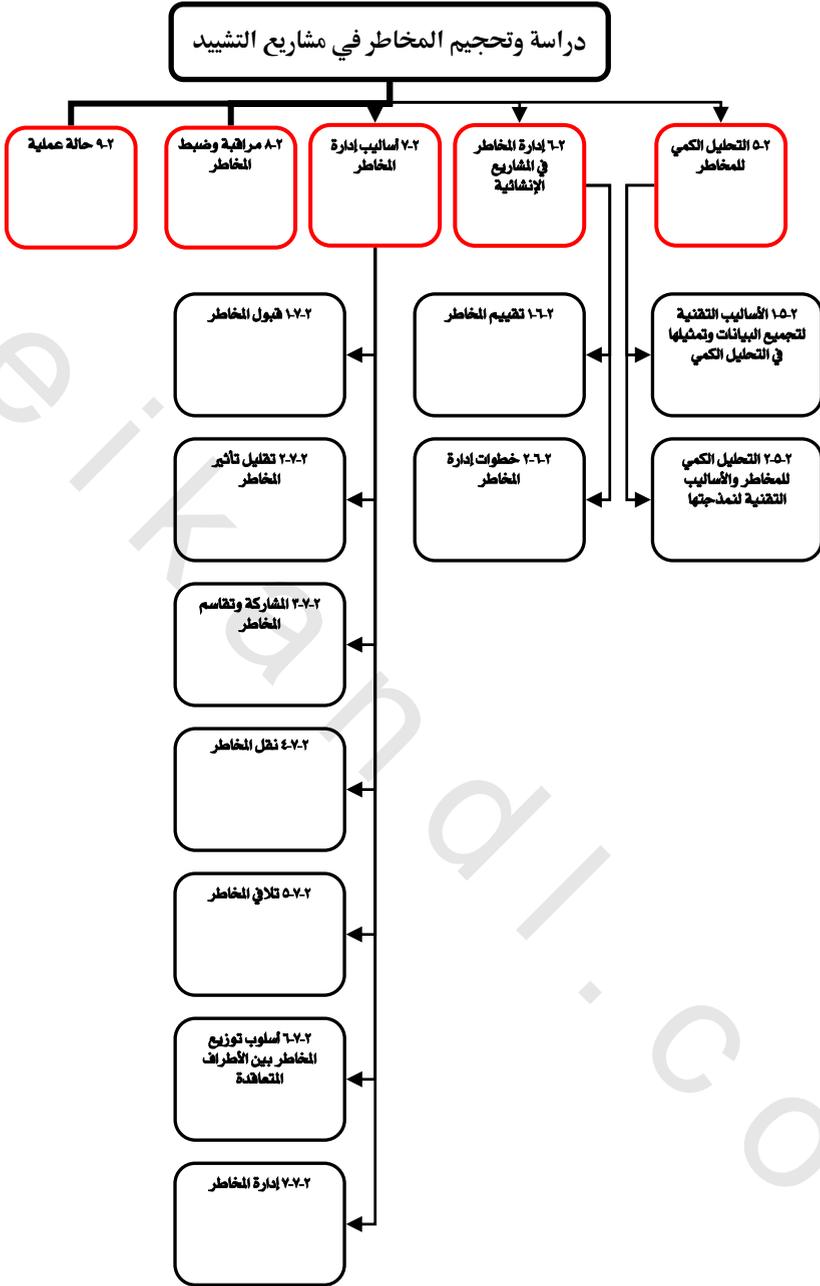
**Studying and Mitigating Risks in Construction Projects:**

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**Risks Definition**

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**Opportunities " " Positive Risks**

**Risks Identification**

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**Risks Identification**

Information Gathering Techniques used in Risk Identification

أ- العصف الذهني :

Brainstorming

ب- تقنية دلفي :

Delphi Technique

ج- عقد المقابلات:

Interviewing

د- القوائم المعدة مسبقاً وقواعد المعلومات المتاحة:

Risk Lists

هـ- تعريف السبب :

Root cause Analysis

**Management-Related Risks :**

Competence of Management

Management Indecision

Mistakes in Judgment

Experience and availability of Personnel / Supervision / Management

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**Owner-Related Risks**

Contract time

Inherent problems of scale

Separate contracts: coordination problems

Timely approvals

Poor briefing

Expectations are at variance with contract documents

The owner changes his mind during construction

owner requests a change to the standard contract

Poor financial arrangements, leading to late payments

A rigid budget determined by an Owner who has difficulty changing it,

Owner's reluctance to reach decisions that might be criticized

Interference of an Owner outside the contract process

Interference of the employer in the technical issues and supervision authorities outside the scope of the contract

Ambiguities in the fee structure and scope of services.

Using unproved designs and elements for the first time.

Late in studying and responding to claim.

Delay in supplying information, or insufficient information.

Ambiguities and contradictions in the project specifications.

Late in studying and approving variations.

Lack of coordination between the design elements.

Under-paying the contractors

Unclear statutory and governmental regulations, and delay in responding to their requirements.

Unclear employer obligations and responsibilities of all the other parties.

Lack of study of the contractor's program

Lack of understanding of responsibilities regarding the channels of communication among the various parties.

**Contractor Related Risks** : - -

Geographic location relative to contractor's home office

Unfamiliar suppliers/labor/inspectors/politics

**Bid preparation**

Construction documents interpretation

Procedure to correct errors between owner, designer, contractor

**Competitive environment**

Bonding capacity

Reputation

Project overhead

Project control

Expertise

Ability to produce alternatives

Conflict management

Political influence

Experience in specification interpretation

Site supervision and management

Cost control and monitoring

Shopping by contractors

Ability to distribute work among subcontractors and coordinate their activities

Availability of financing

Innovative rather than traditional design

Ability to secure new material

Inability to design if the need arises due to unforeseen conditions

Specifications/Contract Terms

Innovative systems or procedures

Non-standardized specifications

Non-standardized general specifications

Ambiguities in obligations based on the contract.

Engineer's "Satisfaction" clauses

Specification ambiguities and construction document deficiencies

Changes due to changes in Owner requirements.

Design errors, omissions and contradictions in documents.

Unilateral action from the employer to change the design or details or manpower.

Payment delays on change orders

impact: effect on unchanged work

Price determination on changes

Availability of material with required quantity in the required time

Availability of equipment in the correct quantity and time.

Bad workmanship and materials

Unpredictable cost

Innovative materials and equipment

Contractor-furnished materials

Workmanship

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Fabrication problems

“Or equal” clause interpretation

**General Factors**

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Delays

Securing permits

Violation of Patent Rights

Laws or regulations that came into effect after the start of work which might impact the work.

Interference from the community surrounding the project.

Environmental impact and environmental protection agencies.

Changes in prices

Currency fluctuations

Changes in taxation

International changes like trade embargoes

Changes in energy cost and their impact on material and labor costs

**Quality Assurance/Quality Control, Inspection, Acceptance, and Warranties:-**

Criteria for approval of work

Acceptance of materials based on specifications and alternatives

Project documentation

Warranties,

Payment certification guarantees and bonds and cash flow.	-
Accurate estimation of cash flow	-
Cash requirements during bidding and initial site preparation	-
Delay in down payment or lack of down payment	-
Regular monthly payment	-
<b>Site Conditions</b>	<b>: - -</b>

**Safety**

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**Subcontractors** : - -

Availability of subcontractors when they are needed and competitive pricing.

Inability of subcontractors to meet their obligations and the impact of that on the progress of work.

Inability of the subcontractor to adhere to the required quality and specifications.

Coordination among subcontractors

Variations in the work and subcontractors' responses

**Labor** : - -

Labor productivity availability, and level of competence

Coordination between labor crews

Strikes

Socio-economic factors and their impact on labor.

Labor morale and attitudes

Unsafe conduct of labor

Instability

Labor laws

Wage changes

Owner

Company and Personal Experience

Contract Documents

Contract Types

Engineer/Architect

Time Schedule

Location

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**Qualitative Risk Analysis**

**Quantitative Risk Analysis**

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## Data Gathering & Representation Techniques

عقد المقابلات :

Interviewing

توزيعات الاحتمالات:

Probability Distributions

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## Quantitative Risk Analysis and Modeling Techniques

تحليل الحساسية :

Sensitivity Analysis

تحليل القيمة النقدية المتوقعة :

Expected Monetary Value Analysis

## تحليل شجرة القرارات :

Tree Decision Analysis

Risk Management in Construction Projects

Risk Assessment and Priority Risks

Risk Management

**RISK ASSESSMENT**

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**Risk Management**

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**Risk Management**

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Risk Acceptance

Risk Reduction Mitigation

Risk Sharing

Risk Transfer

Risk Avoidance

**Risk Acceptance**

**Risk Reduction Mitigation**

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**Value Engineering**

**Risk Sharing**

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**Risk Transfer**

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**Risk Avoidance**

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## **Risk Distribution**

## **Risk Management**

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**Monitor & Control Risk**

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 Impossible to occur -  
 Improbable -  
 Equal Probability -  
 Probable -  
 Highly Probable -  
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No Impact

Marginal

Serious

Critical

Catastrophic


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**آثار السحب أو الإلغاء:**

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**التأمين علي الأشغال:**

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**الأضرار التي تصيب الأشخاص والأموال:**

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**الخطوات الواجب إتباعها:**

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(Bar Chart )

(Crews)

Progress S-Curve

Cash flow

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Updating

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