

Escola Politécnica da Universidade de São Paulo

# FUNDAÇÕES

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# MATERIAL

<http://www.fau.usp.br/disciplinas/mecanica-dos-solos-e-fundacoes/>

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Situações que não podem ocorrer



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### Situações que não podem ocorrer



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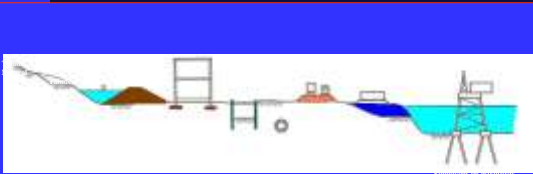
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### Exemplos de Obras de Engenharia Civil Geotécnica



Existem obras que são:

Apoiadas na superfície do solo : Fundações de edifícios, pontes

Inseridas no subsolo: Túneis, subterâneos,

Executadas com solos como material de construção : Estradas, Aterros, Barragens.

De suporte a situações geométricas de desníveis : Muros de arrimo e contenções

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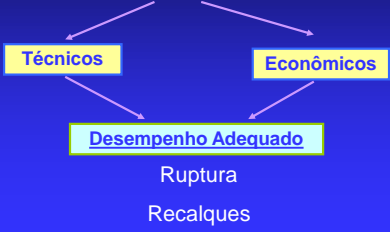
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### Crítérios para Escolha de Fundações



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**Prédio na China**

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## FUNDAÇÕES

- Fundações rasas
- Fundações profundas

Em função da qualidade /  
**competência do subsolo em  
várias profundidades**

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## FUNDAÇÕES

### Fundações profundas

- cravadas – deslocamento
- concretadas in situ

**Método Executivo Importante**

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## ESTADOS LIMITES

**Estado Limite Último - ELU:** Estado que pela sua simples ocorrência determina a paralização no todo ou em parte do uso da construção - **RUPTURA**

**Estado Limite de Serviço - ELS:** Estado que por sua ocorrência, repetição ou duração, causa efeito estrutural que não respeita as condições especificadas para o uso normal da construção ou que são indícios de comprometimento da durabilidade da estrutura - **RECALQUES**

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## FUNDAÇÕES

Segurança perante Ruptura – Fator de Segurança - FS

Estimativa recalques e comprovação aceitabilidade em relação a tipo de estrutura/acabamento/funcionabilidade

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## FUNDAÇÕES

Lembrar sempre da **ESTÁTICA**

**Esforços:** verticais, horizontais e momentos

**Estabilidade:**  $\Sigma V = 0$

$$\Sigma H = 0$$

$$\Sigma Ma = 0$$

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Prova de carga em Placa




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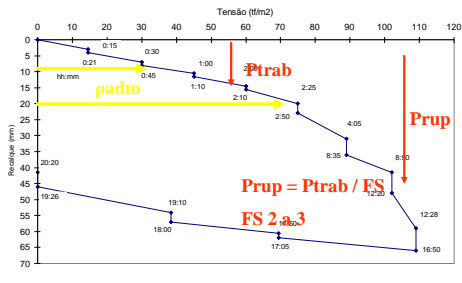
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Prova de Carga em Placa Circular  $\phi = 80$  cm




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Elementos Necessários para o Projeto de FUNDAÇÕES e Critérios de Projeto

**ELEMENTOS NECESSÁRIOS**

- 1- Topografia da Área
- 2- Investigações geológico-geotécnicas
- 3- Informações da estrutura
- 4- Informações das construções vizinhas
- 5- Conhecimento das práticas locais
- 6- Noção de preço das soluções

**CRITÉRIOS DE PROJETO**

Ações nas Fundações

- a- Cargas Vivas:
- cargas operacionais
  - cargas ambientais (ventos, ...)
  - cargas acidentais (colisão, ponte rolante, ...)
- b- Cargas Mortas:
- peso próprio
  - empuxos (solo, água)

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## SAPATAS



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## SAPATAS



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## TUBULÕES

Tubulão a céu aberto



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# TUBULÕES

Tubulão a céu aberto



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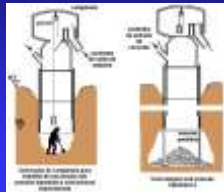
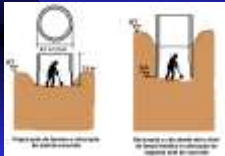
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# TUBULÕES

Tubulão a ar comprimido



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# ESTACAS



Madeira

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Escola Politécnica da Universidade de São Paulo

# ESTACAS

Pré-moldada de concreto



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Escola Politécnica da Universidade de São Paulo

# ESTACAS

Pré-moldada metálica



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# ESTACAS

Estaca Strauss



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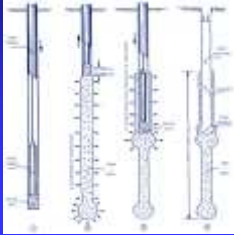
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# ESTACAS

Estaca Franki



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# ESTACAS

Estaca Hélice Contínua



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# ESTACAS

Estaca Hélice Contínua Secante



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# ESTACAS

Estaca Ômega



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# ESTACAS

Estaca Raiz



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# ESTACAS

Estaca Barrete / Parede Diafragma



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# ESTACAS

Estação



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# ESTACAS

Parede Diafragma Moldada "in loco" e Pré-moldada



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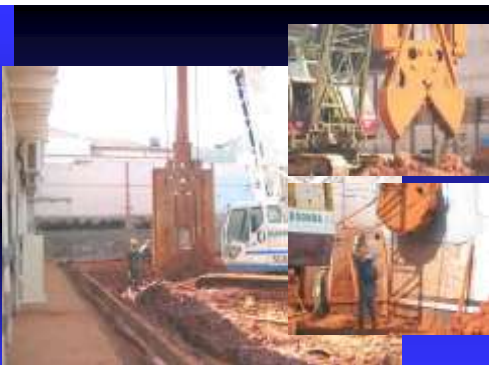
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**Escavação para parede diafragma**

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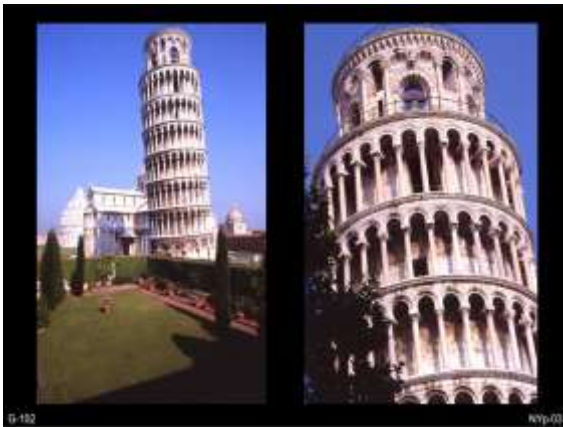
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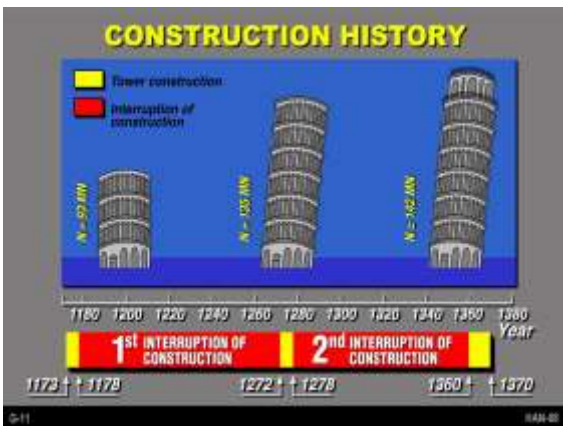
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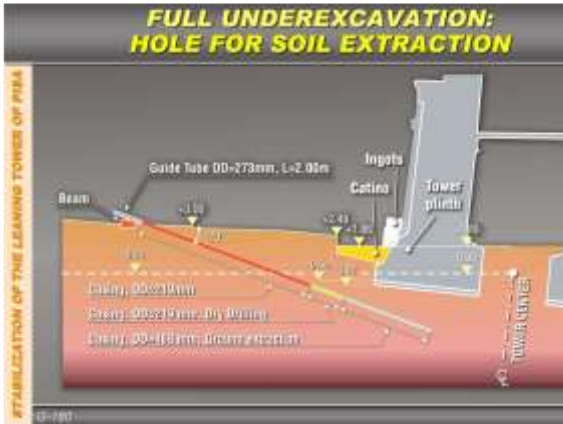
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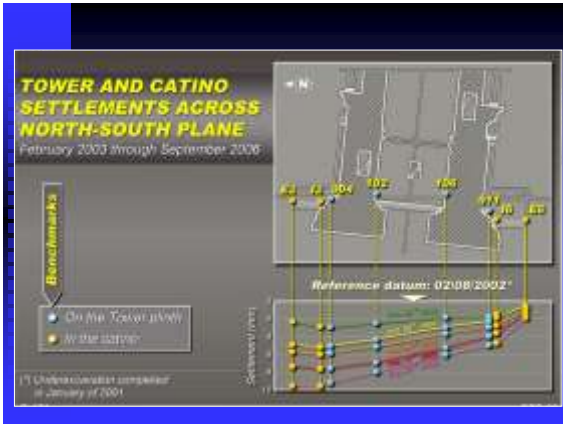
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# VALAS

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Perfis metálicos escorados e pranchada de madeira

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Perfis metálicos escorados e pranchada de madeira

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Perfis metálicos e pranchada de madeira

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**Tubulões atirantados**

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**Estações atirantados**

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**Estacas e perfis metálicos atirantados**

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**Estacas secantes e perfis metálicos atirantados**

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**Estacas secantes e perfis metálicos atirantados**

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**Estacas e concreto projetado**

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**Estações, perfis metálicos atirantados e estroncas metálicas**

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**Estações, perfis metálicos atirantados e estroncas metálicas**

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**Estações e perfis metálicos atirantados**

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**Estações, concreto projetado e  
estroncas metálicas**

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**Estações, perfis metálicos  
atirantados e estroncas metálicas**

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**Estações atirantados**

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Estacas escoradas



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Estacas secantes atirantadas



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Estacas secantes atirantadas



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Parede diafragma atirantada

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Execução de perfuração para tirante

Parede diafragma atirantada

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Parede diafragma atirantada

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Parede diafragma atirantada

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Estacas prancha atirantadas /  
escoradas

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Estacas prancha escoradas

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**Parede diafragma escorada  
(perfis metálicos treliçados)**

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