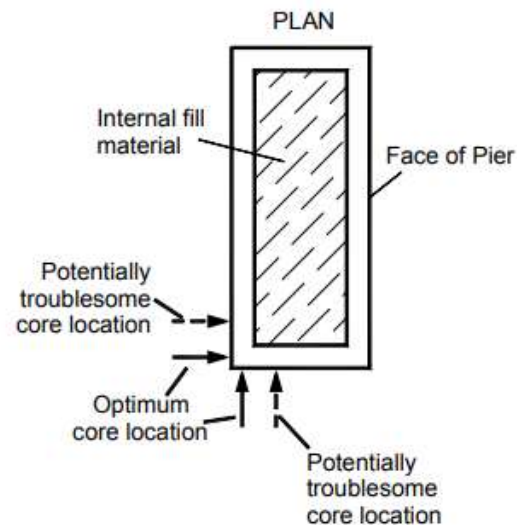


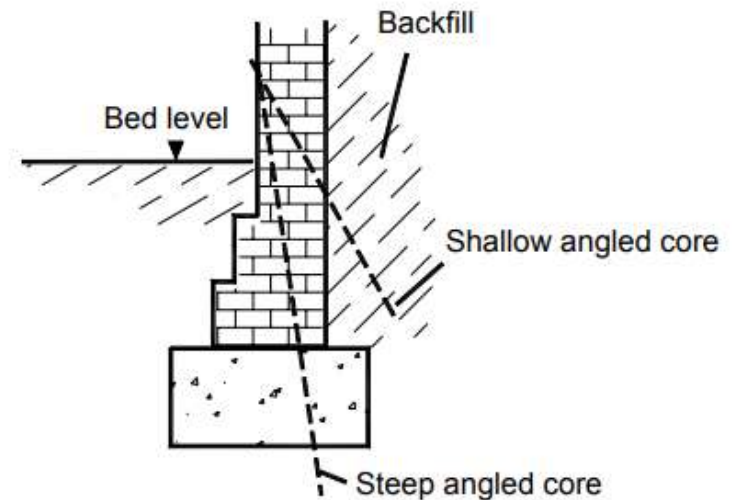
Foundation type and depth

- Site investigation
 - Coring

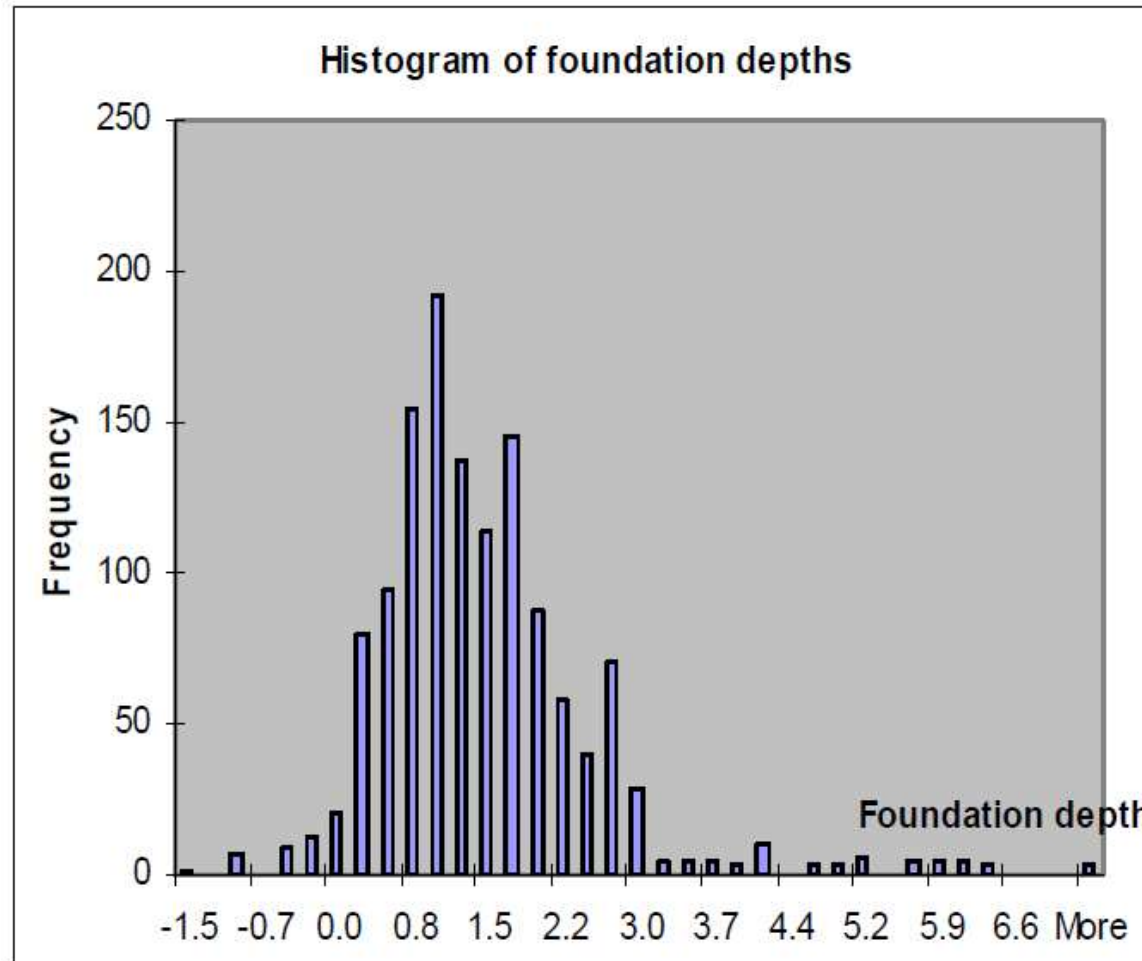
Optimum core location



Coring angle



Foundation type and depth



If no data are available, a 1m foundation depth can be assumed

Design flood

- Design flood should be chosen based on appreciation of consequences of failure throughout the design life of the structure
- Lifetime probability of exceedance P is given by

$$P = 1 - \left(1 - \frac{AEP}{100}\right)^{Tf}$$

where AEP = annual exceedance probability (%)

Tf = design life (years)

Initial Scour Assessment

- Initial assessment can be used to manage risk, prioritise detailed assessments and inform inspection, survey and detailed assessment.
- A desk study to establish what data are available for a structure and what additional data are needed is carried out.
- Photographs should be taken for use in the immediate assessment and compare changes over time.

Initial Scour Assessment

Checklist for screening

Main feature	Risk factors
Scour history	<ul style="list-style-type: none"> ● evidence of existing scour or history of scour.
Watercourse type	<ul style="list-style-type: none"> ● active degradation and aggradation ● significant lateral movement or erosion of banks ● steep slopes and high flow velocities ● sand/gravel mining from or near the river ● history of flood damage to riverside structures.
Asset location	<ul style="list-style-type: none"> ● structure sited at or near a bend or confluence ● structure sited in an estuary.
Structure design	<ul style="list-style-type: none"> ● spread footings or short piles ● superstructure vulnerable to collapse in event of foundation movement ● structure has inadequate flood openings and forms significant obstruction to flow ● structure vulnerable to collection of debris and ice.
Consequence of failure	<ul style="list-style-type: none"> ● failure could cause any traffic crossing the structure to fall into the river itself or derailment ● failure could lead to the release of a 'dam-break' type flood wave downstream.

Initial Scour Assessment

Data	Issues to be considered
Previous assessments (if available)	<ul style="list-style-type: none"> ● Was the structure considered vulnerable to scour and what measures were taken for monitoring or remediation?
Construction records (including any site investigations and any remedial works records)	<ul style="list-style-type: none"> ● Availability of construction drawings (often archived) to ascertain type and depth of foundation, and nature of load-bearing material. ● Adequacy of information regarding structure dimensions. ● Type of foundation and associated vulnerability to scour. ● Coring reports giving foundation depth and formation material (evidence of a coring survey can often be found on site). ● Evidence of scour holes. ● Evidence of nature of river bed material.
Maps and aerial photographs	<ul style="list-style-type: none"> ● What do historic maps and aerial photographs reveal about the stability of the river channel and past changes to the structure?
Previous inspection reports or underwater surveys (if available)	<ul style="list-style-type: none"> ● Evidence of changes in river bed level or movement of the river channel since construction or between successive surveys, giving indications of aggradation, degradation and channel instability. ● Evidence of defects or significant fluctuation in bed levels. ● Evidence of structural defects or debris accumulation. ● Evidence of scour holes around piers and abutments.
Planning and preparations for field appraisal and inspections	<ul style="list-style-type: none"> ● Scope required, bearing in mind result of screening. ● Any particular matters to look out for (such as condition of previous remedial measures, aggravation of previously noted problems). ● Access requirements, for example, boat work, vegetation clearance. ● Survey equipment requirements. ● Survey requirements to make good any shortcomings in construction records. ● Underwater inspection needed (either for condition of structure or depth of scour). ● For tidal sites, timing of inspection and survey in relation to tidal flow conditions and requirements for engineer's field appraisal.

Initial Scour Assessment

- It can be helpful to compare bed profiles from past and present underwater inspections to identify any lowering of the bed in the vicinity of a structure that increases vulnerability to scour.
- Bridges may be classed as low risk if one or more of the following conditions are satisfied:
 - the structural element is outside the floodplain
 - the structural element is founded on erosion-resistant rock
 - adequate scour protection is provided
 - a satisfactory invert is provided
- Bridges where the type or depth of foundations is unknown are common and should be carried forward to detailed scour assessment, which ensures a conservative approach.