New Challenges for Army Combat Engineers:

Bomb Damage Assessment, Fire Damage Assessment, Evaluation of Diminished Capacity, and Developing New Strategies for Short, Medium and Long-term Mitigation/Repair

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Tikrit Bridge Demolition by Iraqi Forces

Views From the Bridge

Bomb Damage Assessment

- Critical structures damaged by bombs and Improvised Explosive Devices must be evaluated for capacity. No clear cut methodologies or established protocol is presently included in combat engineering training syllabus to educate junior officers how to go about these tasks.

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Bomb and fire-damaged bridge decks required immediate evaluation of diminished capacity. Then, decisions about what kinds of short, medium or long-term measures to effect repairs. At present, long-term repairs are generally turned over to civilian contractors.

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Fire Damage Assessment

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The traditional role of combat engineers has been Short-term combat bridging – “only there long enough to win the battles”

This view shows the longest floating river bridge assembled in a combat theater since World War II, across the Tigris River in Tikrit. A typical pontoon treadway bridge can be erected in just 6 hours, but would require two multi-role bridge companies, 36 Bridge Erection Boats, 80 Assault Float Bridge sections and 24/7 operability of the boats.

Tikrit Highway Bridge Assessment & Temporary Repairs

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Temporary Bridge Solution


East Bound Traffic

Mabey Johnson Bridge end connections

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Pier 8, east end

Damaged Pier 7, west end

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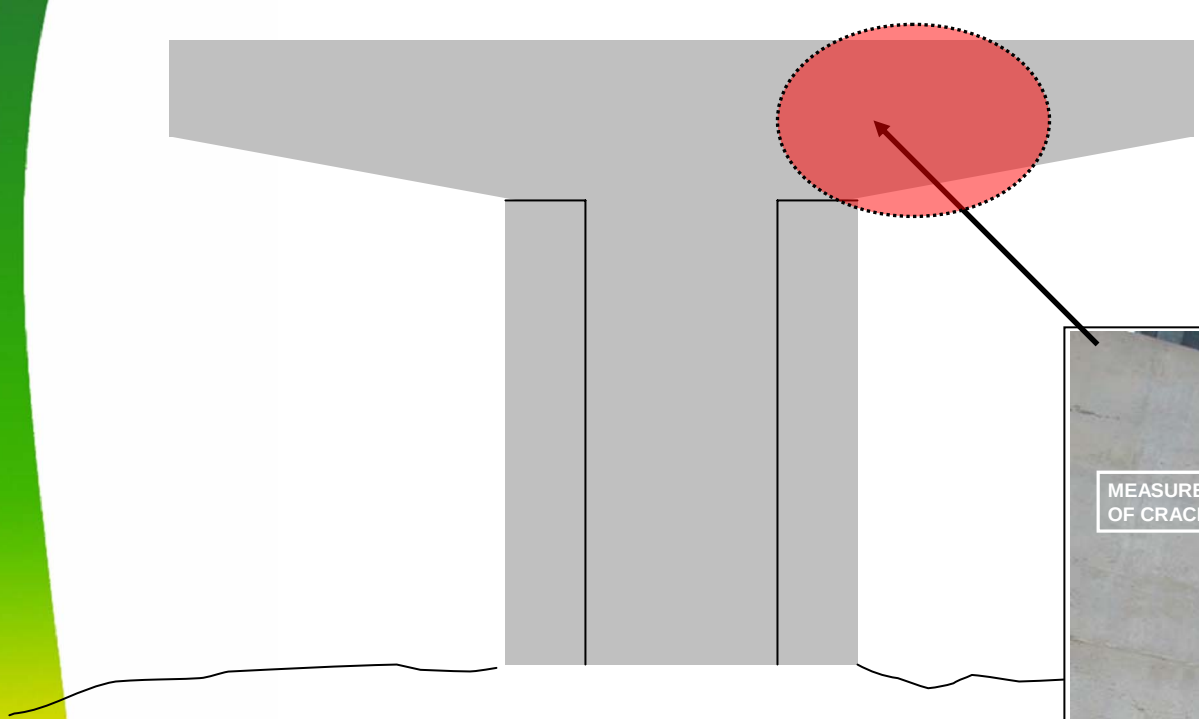
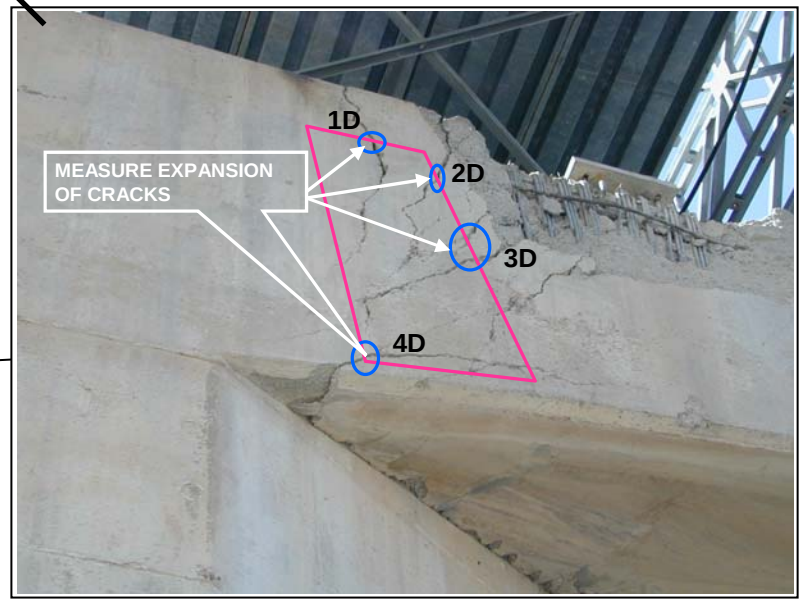
PIER 7 FRONT VIEW



NORTH



*Mostly surface damage cracks -
do not require daily measurement

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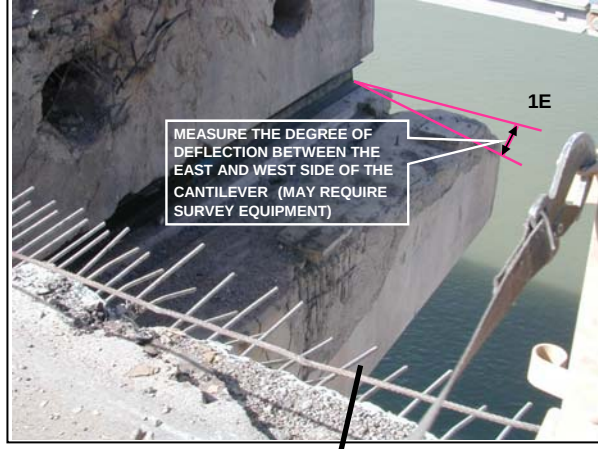
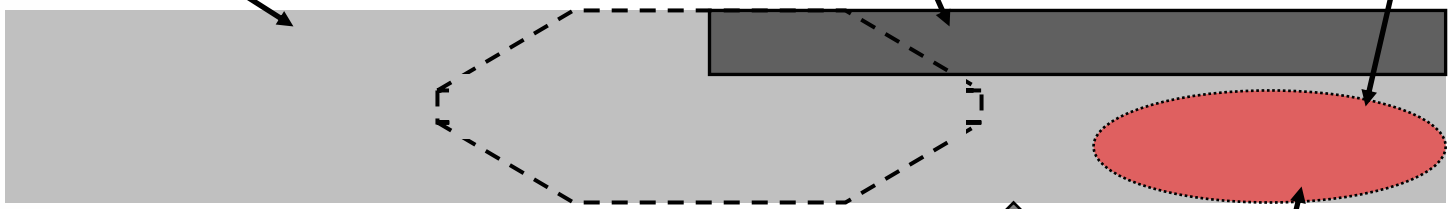
PIER 7 TOP VIEW



Bridge Pier Cap w/ Cantilever ends

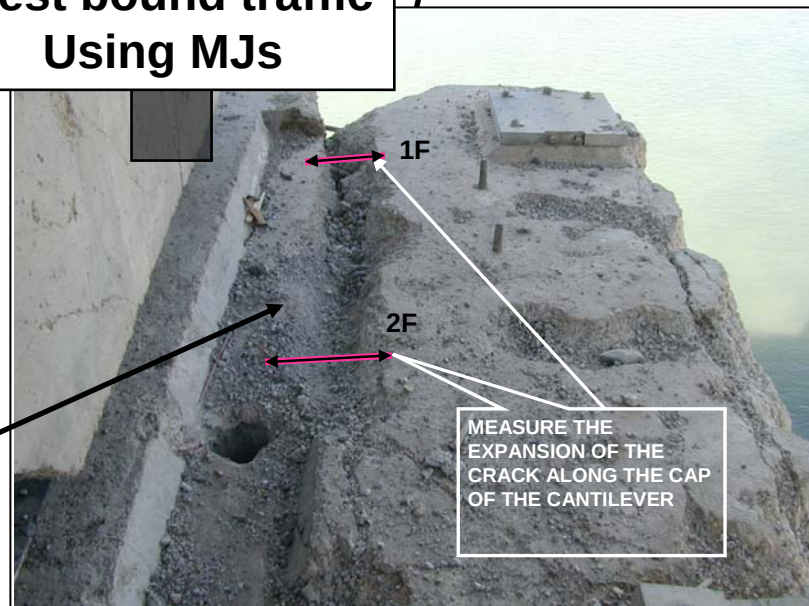
Bridge Beam & MJ Bearing area



East bound traffic

West bound traffic Using MJs

Bridge Pier



*Critical crack requires daily measurement

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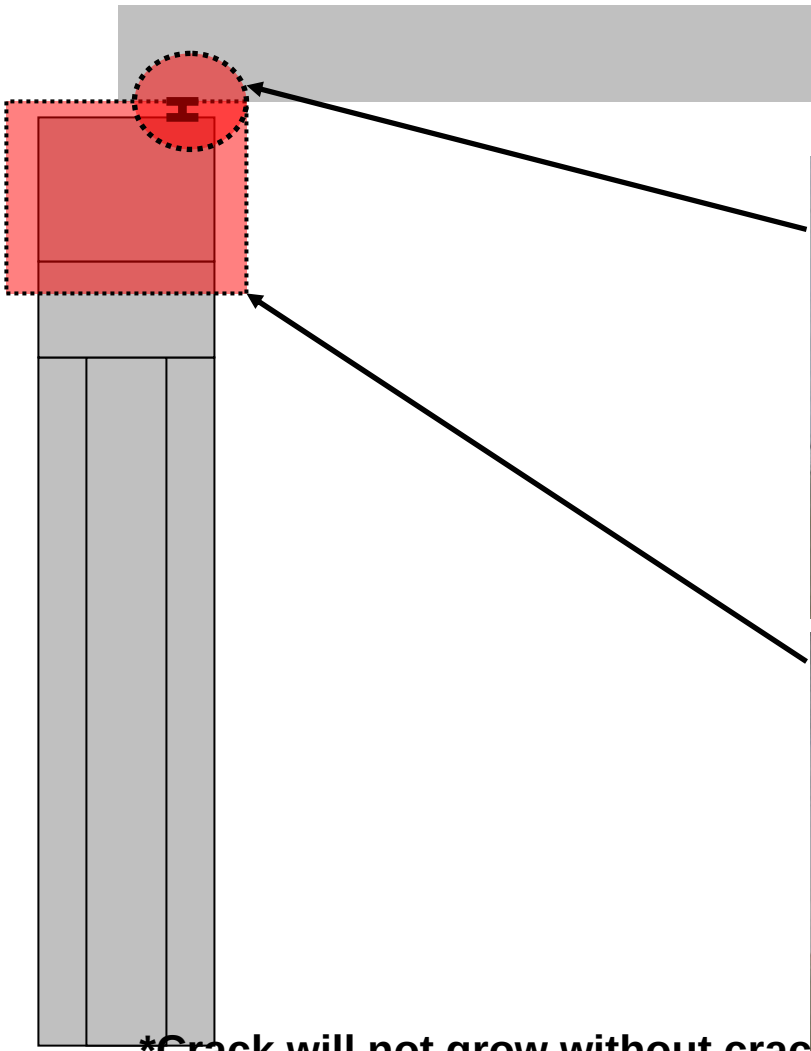
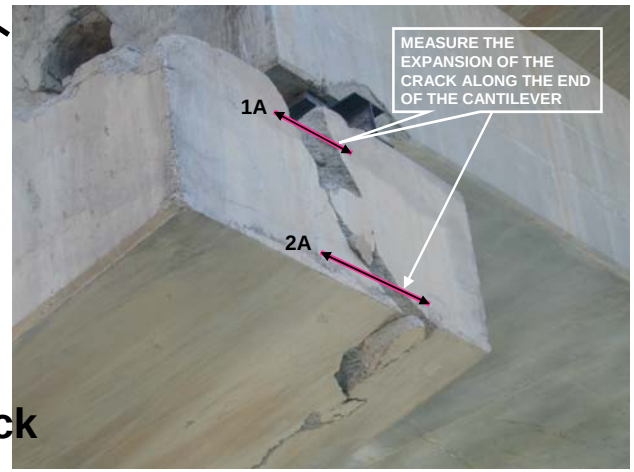
PIER 7 SIDE VIEW



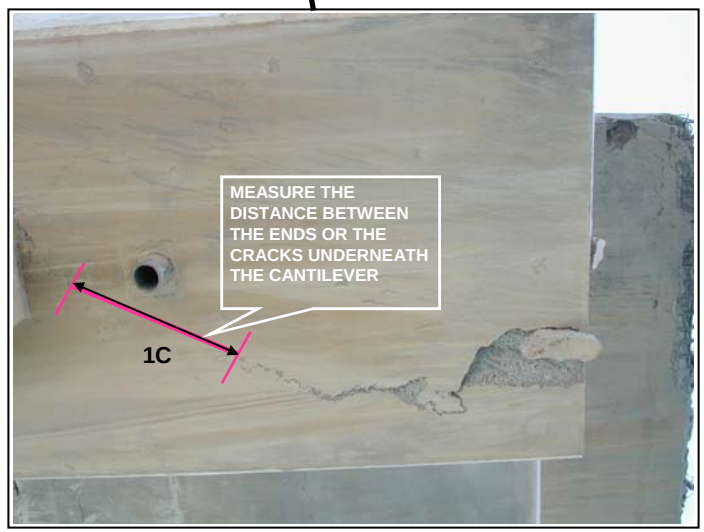


***Crack will not grow without crack on top of the pier cap growing**
Do not require daily measurement

PIER 7 BOTTOM VIEW

Bridge Pier Cap w/ Cantilever ends

Bridge Pier



***Crack will not grow without crack on top of the pier cap growing Do not require daily measurement**

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- **Mabey Johnson spans placed on upstream side of tail span gaps on the Tikrit Bridge across the Tigris River. Note repair of Pier 7.**

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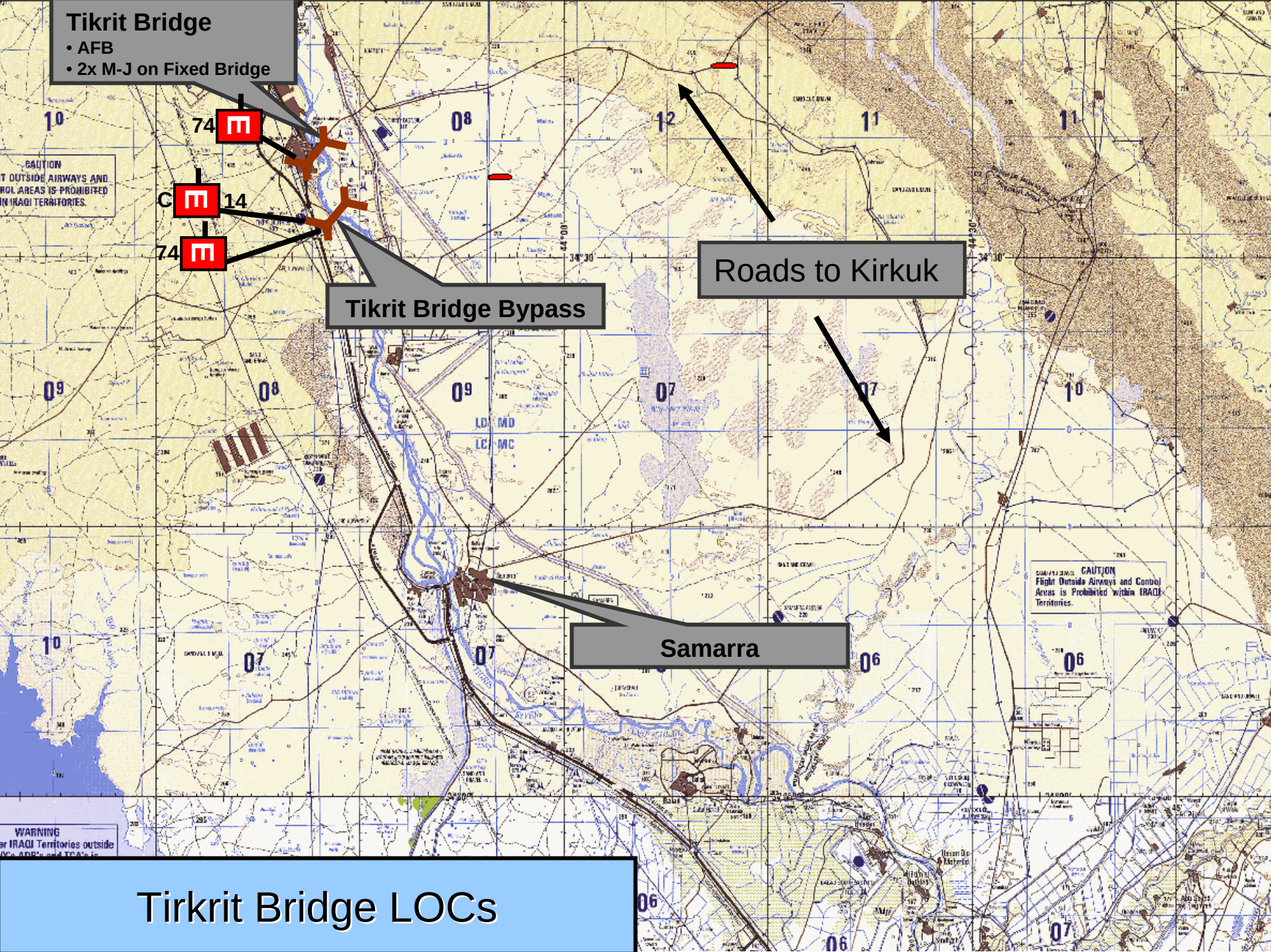
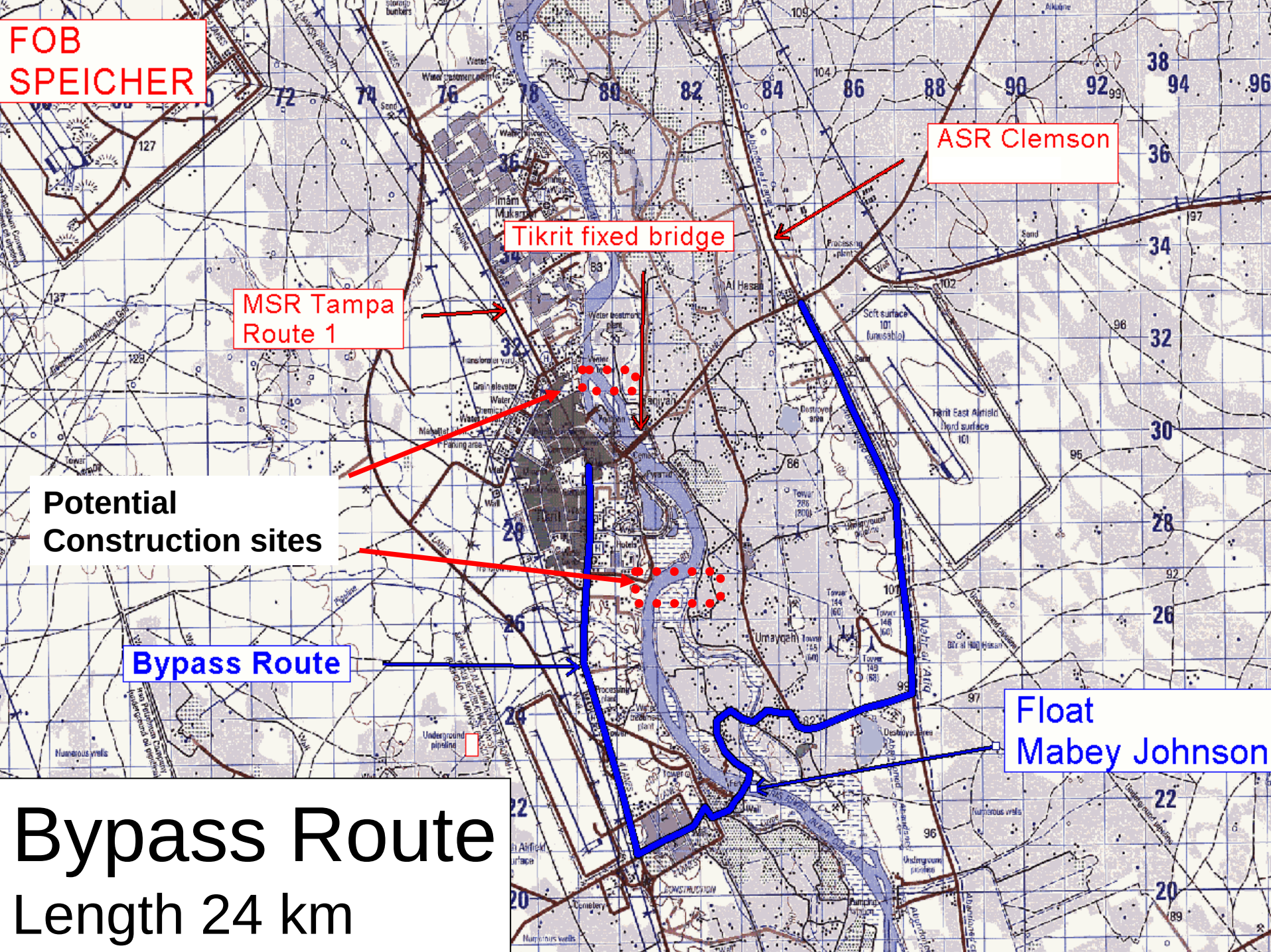
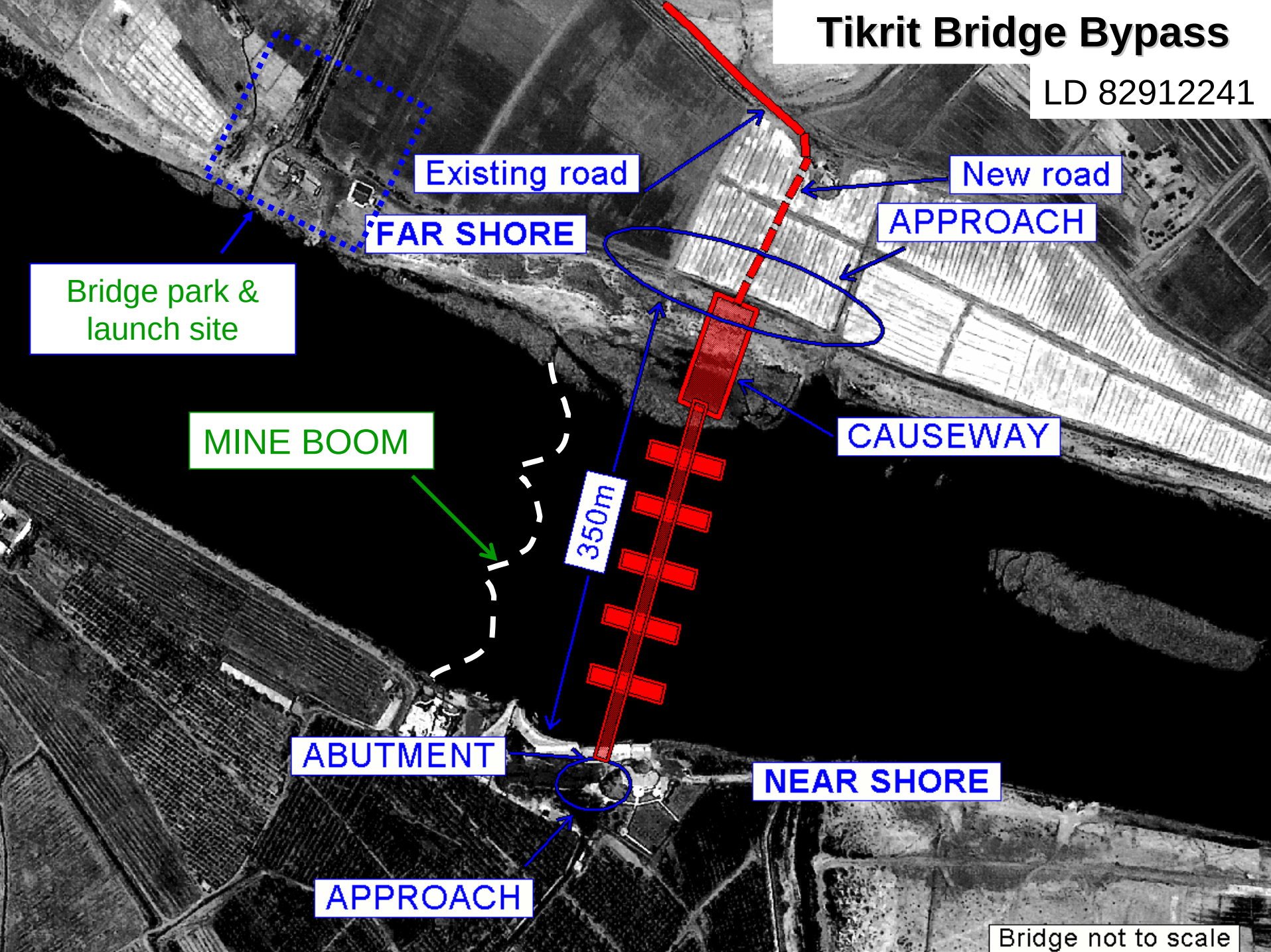

Tikrit Bridge
• AFB
• 2x M-J on Fixed Bridge
74
C
14
74
Tikrit Bridge Bypass
Roads to Kirkuk
Samarra
Tirkrit Bridge LOCs



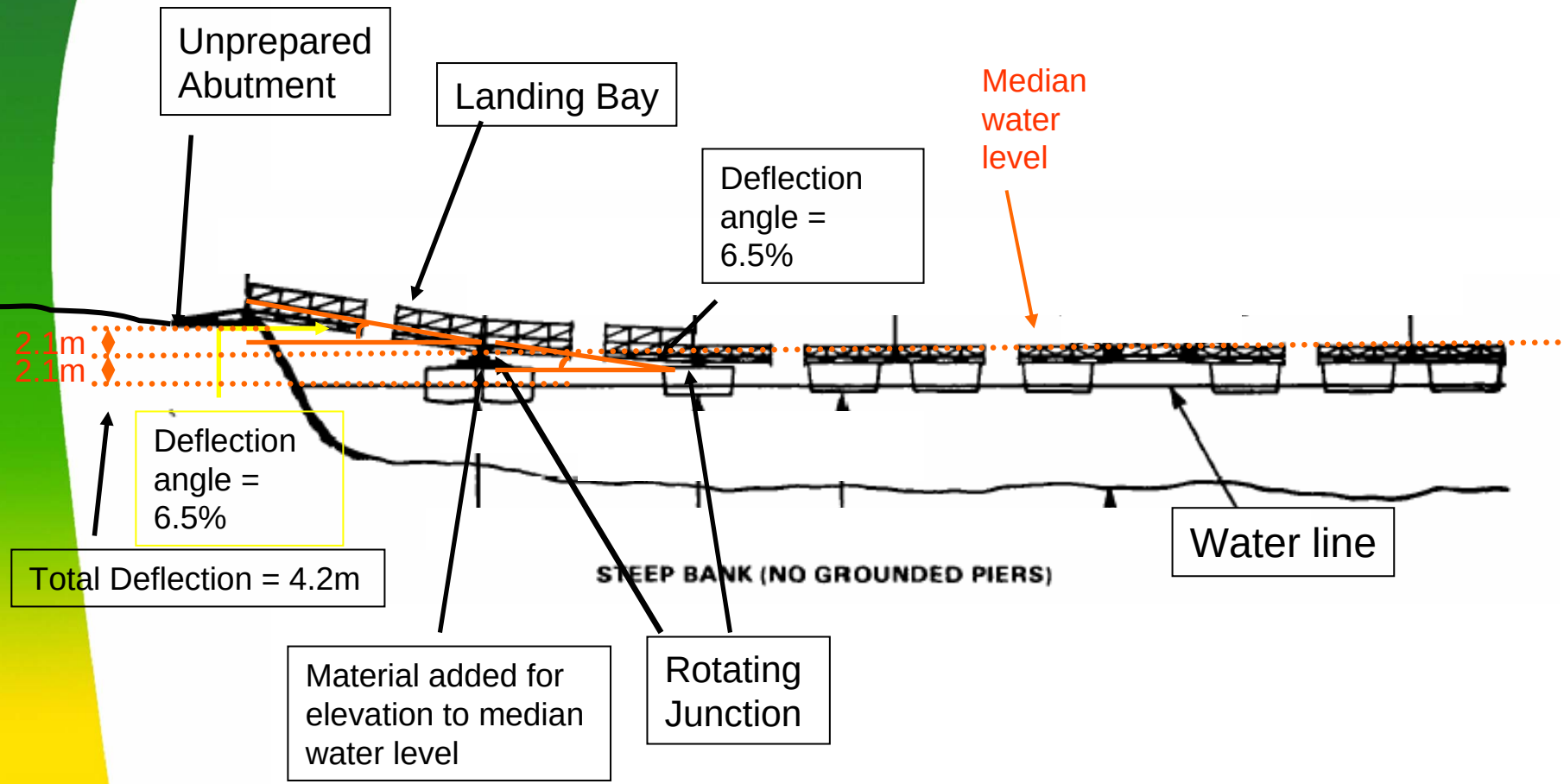
Bypass Route

Length 24 km


Tikrit Bridge Bypass
LD 82912241
Existing road
New road
FAR SHORE
APPROACH
Bridge park & launch site
MINE BOOM
CAUSEWAY
350m
ABUTMENT
NEAR SHORE
APPROACH
Bridge not to scale

Tikrit By-Pass Construction

Decisive Point – Bridge to Shore Connection



Near shore (West side)

Unloading and moving Individual Pontoons

Pontoons Specifications:

- 40,000lbs ea
- 2 sizes: 40 & 20 ft
- 7 ft deep
- 10 ft wide

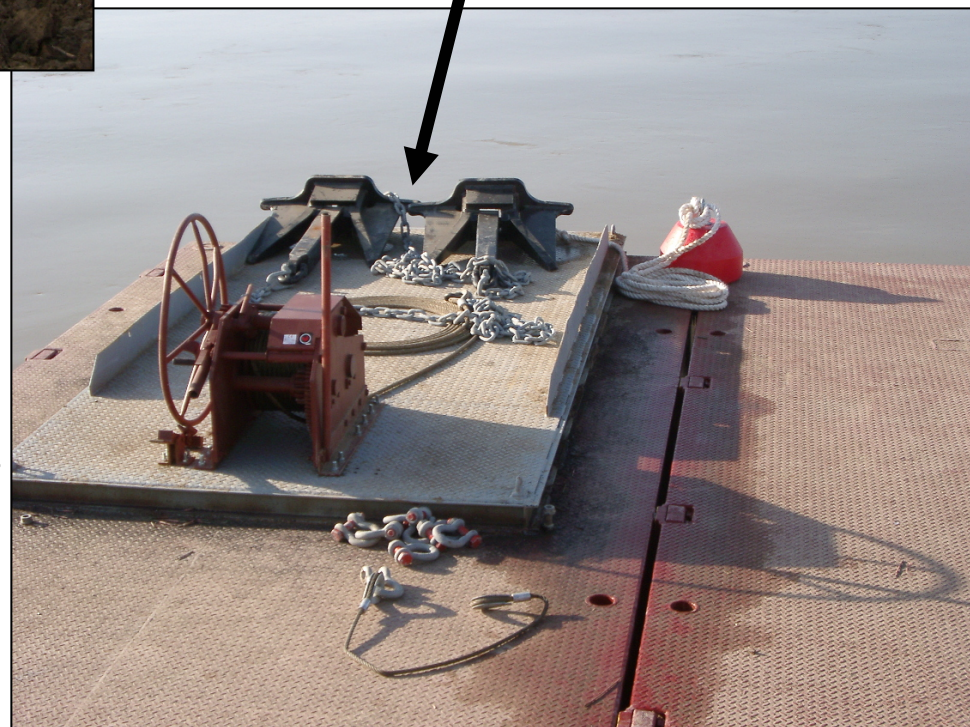
Launching Individual Pontoons

Assembling Floating Pontoon Piers

Assembled Span Launched

Filling 40 ft pontoon with soil
Before scuttling

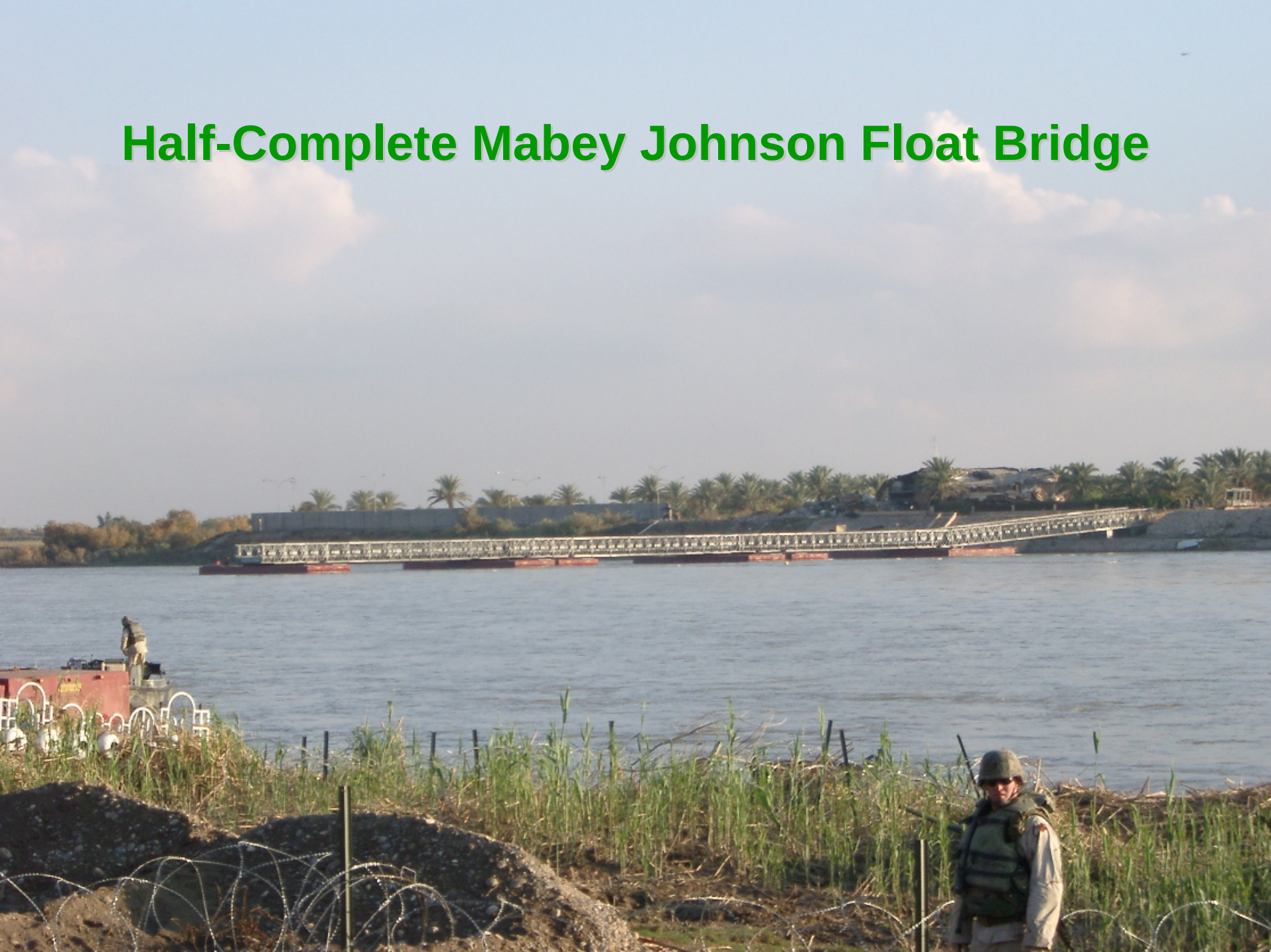
Fluted anchors doubled on line
& Adjustable winches



Anchoring:

- River bottom investigated by Army divers
- Buried transoms used as Dead-man anchors for end spans
- Fluted anchors & pontoons filled with soil used for intermediate spans

Half-Complete Mabey Johnson Float Bridge



12 month pontoon bridge constructed by Bechtel across Tigris River

- Segmented Mabey-Johnson trusses laid on rectangular steel pontoons. Each pontoon weighed 40 kips; lashed together in groups shown here. MLC 110 kip vehicle capacity, suitable for transit of M1A1 Abrams on transporters

Opening and Proofing

Completed Mabey Johnson Float Bridge

Old Bailey Bridge across Tigris Estuary (MLC 40)

Lateral Sway supports

Armored Vehicle Launched Bridge (AVLB) MLC 70

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