

Communities and Artisanal & Small-scale Mining

**“Effective Partnership for Sustainable
ASM communities”**

7th Annual CASM Conference

PART II.

**“Banka & Bore-Pile drilling techniques
for deep sampling
the placer deposits of gemstone”**

Special for the honorable guests of CASM

Ulaanbaatar - Mongolia - September 7th to 12th, 2007.



**WORLD GEMSTONE EXPLORATION & MINING
CONSULTANT CO., LTD.**

1055/702, 32nd floor, State Tower Bangkok Building,
Silom Road, Bangrak, Bangkok (Thailand).

MR. ROUAY LIMSUWAN

This report

FOR : Gemstone's motherlands,
all of my Spiritual instructors and
Gemstone - Mining entrepreneurs.
(especially for Artisanal and Small-scale miners)

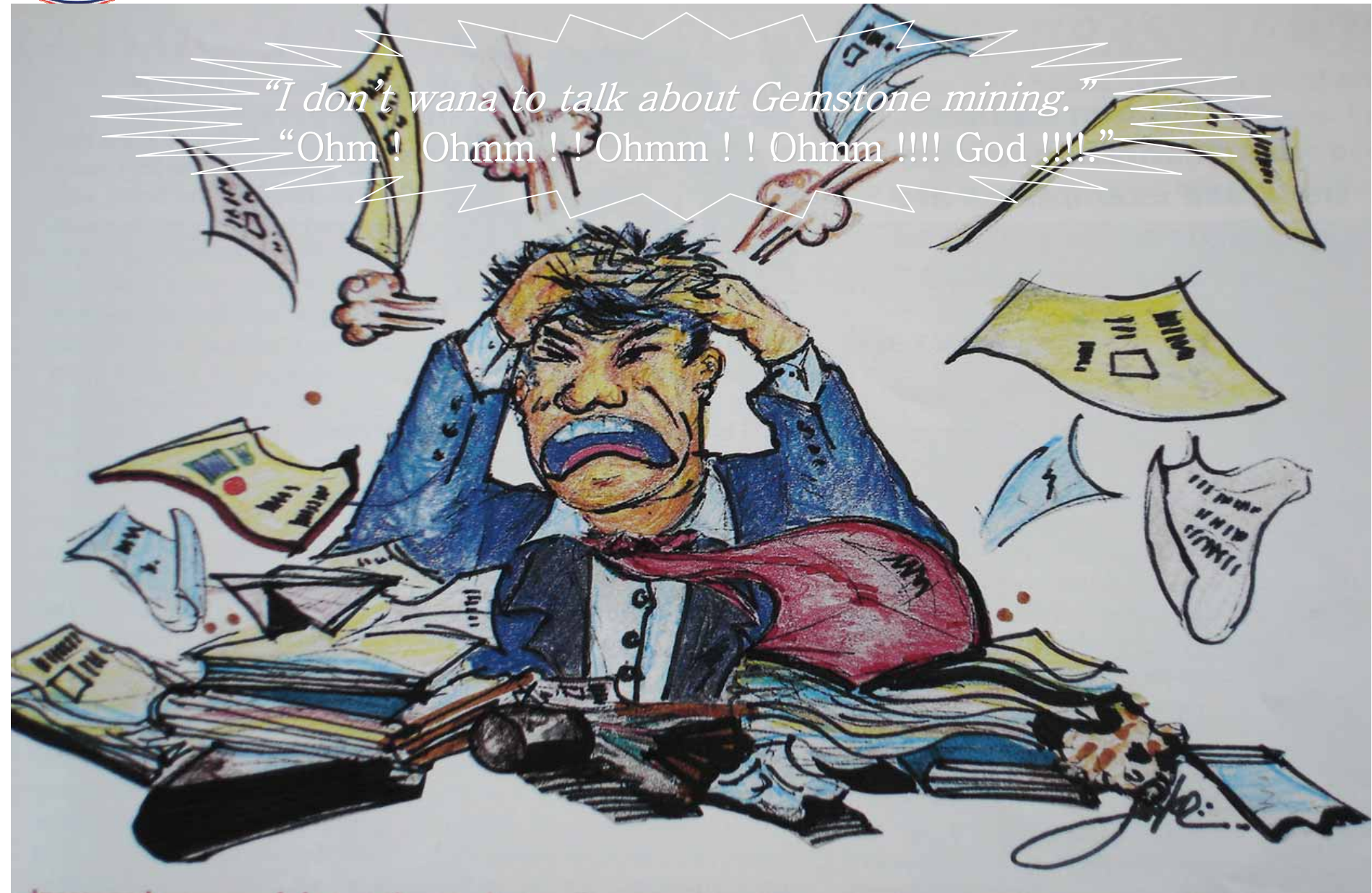
**Who are the sources of everything in
this report.**

**Without these sources, the writing in
this report would have been
impossible.**



"I don't want to talk about Gemstone mining."

"Ohm ! Ohmm !! Ohmm !!! Ohmm !!!! God !!!!"





Acknowledgement

Maximum Thanks

“Gemstone Mining entrepreneurs who are the owner of the pictures, used as a case study in this report.”





PART II. Gemstone Drilling - Exploration

II. Gemstone Drilling-Exploration methods.

1. Gemstone Drilling-Exploration by manual method.
2. Gemstone Drilling-Exploration by Banka drilling.
3. Gemstone Drilling-Exploration by Excavator-machine.
4. Gemstone Drilling-Exploration by Bore - Pile drilling.
5. The comparison of the drilling capability between “Banka- drilling” and “Bore-Pile drilling”
6. Sample analysis treatment.
7. Sorting gemstone gravel bed by “Concrete Mixer”.



Drilling Exploration

The main drilling methods : -

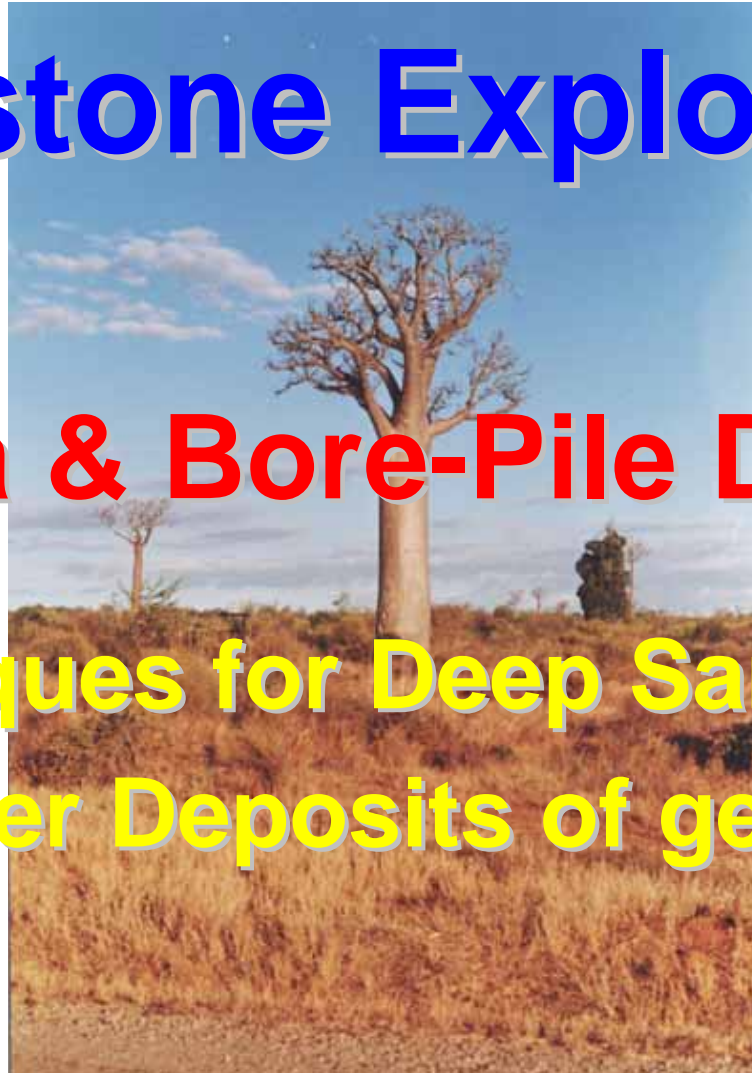
- 1) Diamond drill**
- 2) Rotary drill**
- 3) Percussion**
- 4) Churn drill**
- 5) Jet drill**



Gemstone Exploration

“Banka & Bore-Pile Drilling”

**Techniques for Deep Sampling the
Placer Deposits of gemstone.**





Gemstone Exploration

“Banka & Bore-Pile Drilling”

Techniques for Deep Sampling the Placer Deposits of Gemstone.



Exploration Drilling by “Banka Drilling”

*Drill with the most popular
casing of ϕ 4 inches and
bailer ϕ 2.5 inches*





“Banka Drilling” method

Four men stand on the platform fasten the drilling rod in the casing which connected with the bailer bit at the lower end then jerked up and down.





“Banka Drilling” method

Four men stand on the platform fasten the drilling rod in the casing which connected with the bailer bit at the lower end then jerked up and down.





“Banka Drilling” method

Four men on the ground turn the casing clamp arms forward and backward for helping the casing to penetrate into the ground.



Collecting samples by “Banka Drilling”.

- Banka Drilling
 - Small portion of samples can be collected at each time.
 - The biggest grain size of the samples are ϕ 2.5 inches.
 - Total volume of the collecting sample per hole is about 10-20 litres.







Collecting samples by “Banka Drilling”.

- Banka Drilling
 - Small portion of samples can be collected at each time.
 - The biggest grain size of the samples are ϕ 2.5 inches.
 - Total volume of the collecting sample per hole is about 10-20 litres.





Exploration Drilling by “Bore-Pile Drilling”

Usually 3 sizes of the casing can easily be chosen that are ϕ 30, ϕ 50, and ϕ 70 cm. depending on the purpose of treatment.



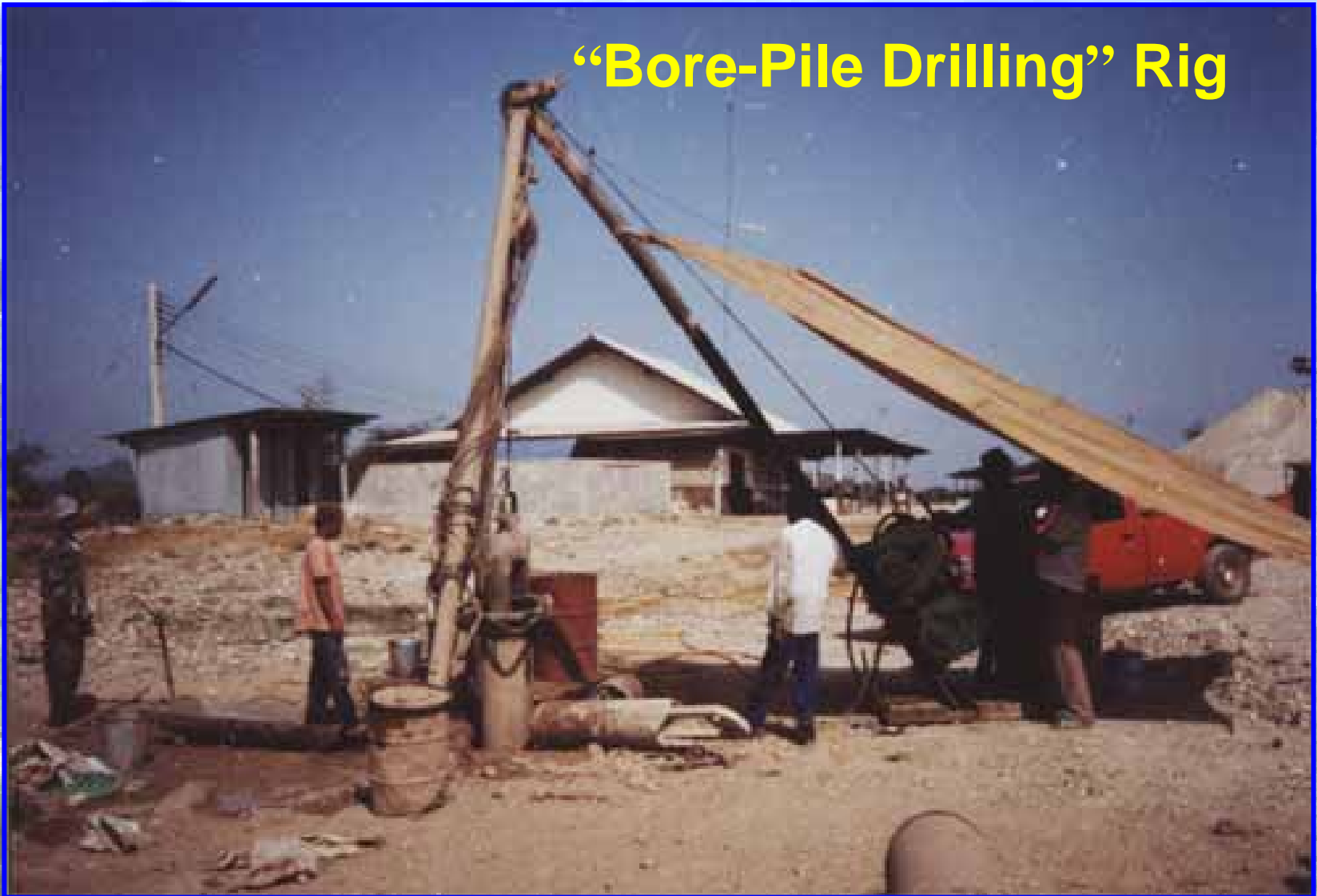
Exploration Drilling by “Bore-Pile Drilling”

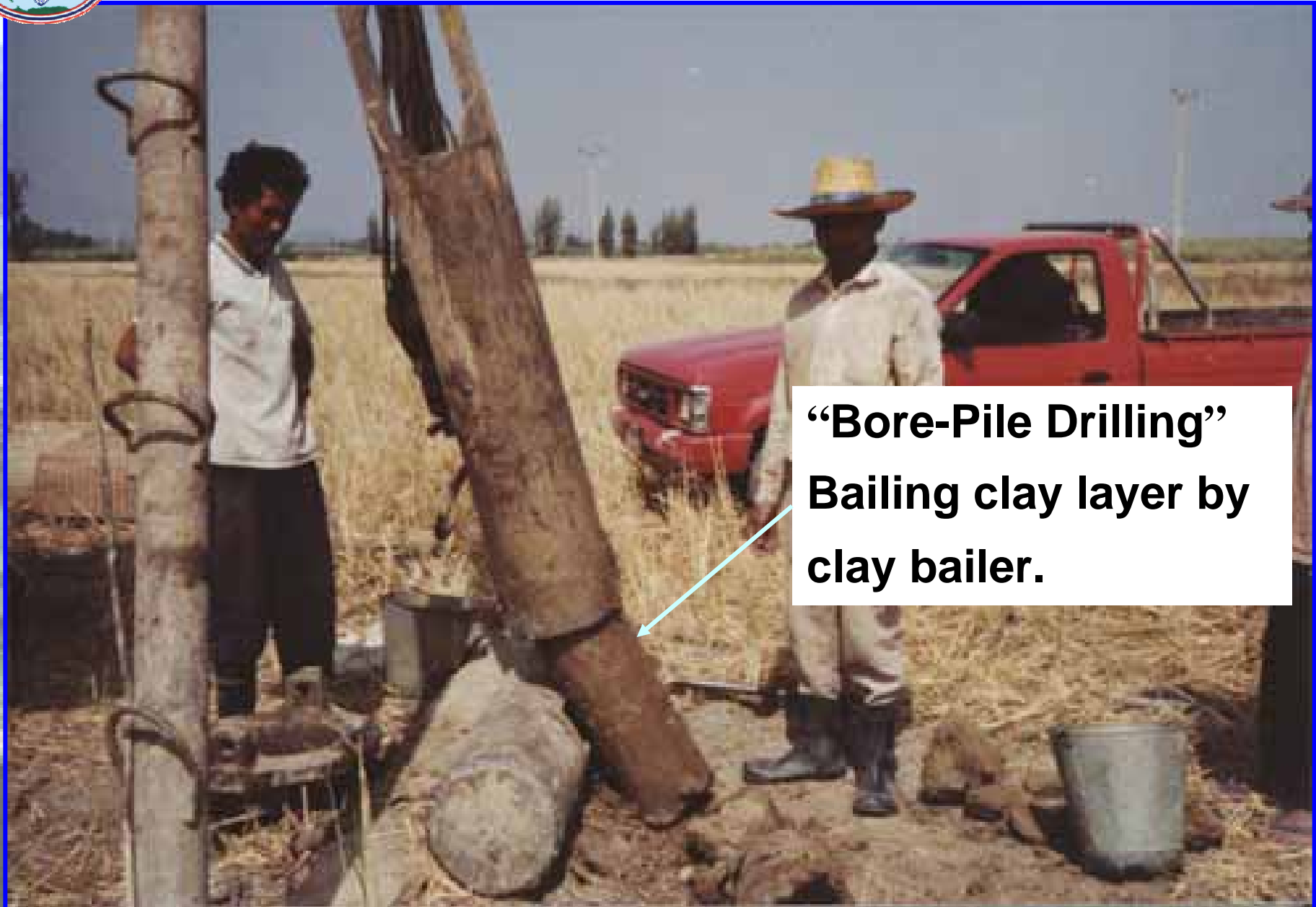
*Drill with the smallest casing
of ϕ 35 cm. (15 inches)
and bailer ϕ 30 cm.(12 inches)*





“Bore-Pile Drilling” Rig







“Bore-Pile Drilling” method.
Hammering down the casing
with hammer of 300 kgs and
I-shape Iron bar.



“Bore-Pile Drilling” method



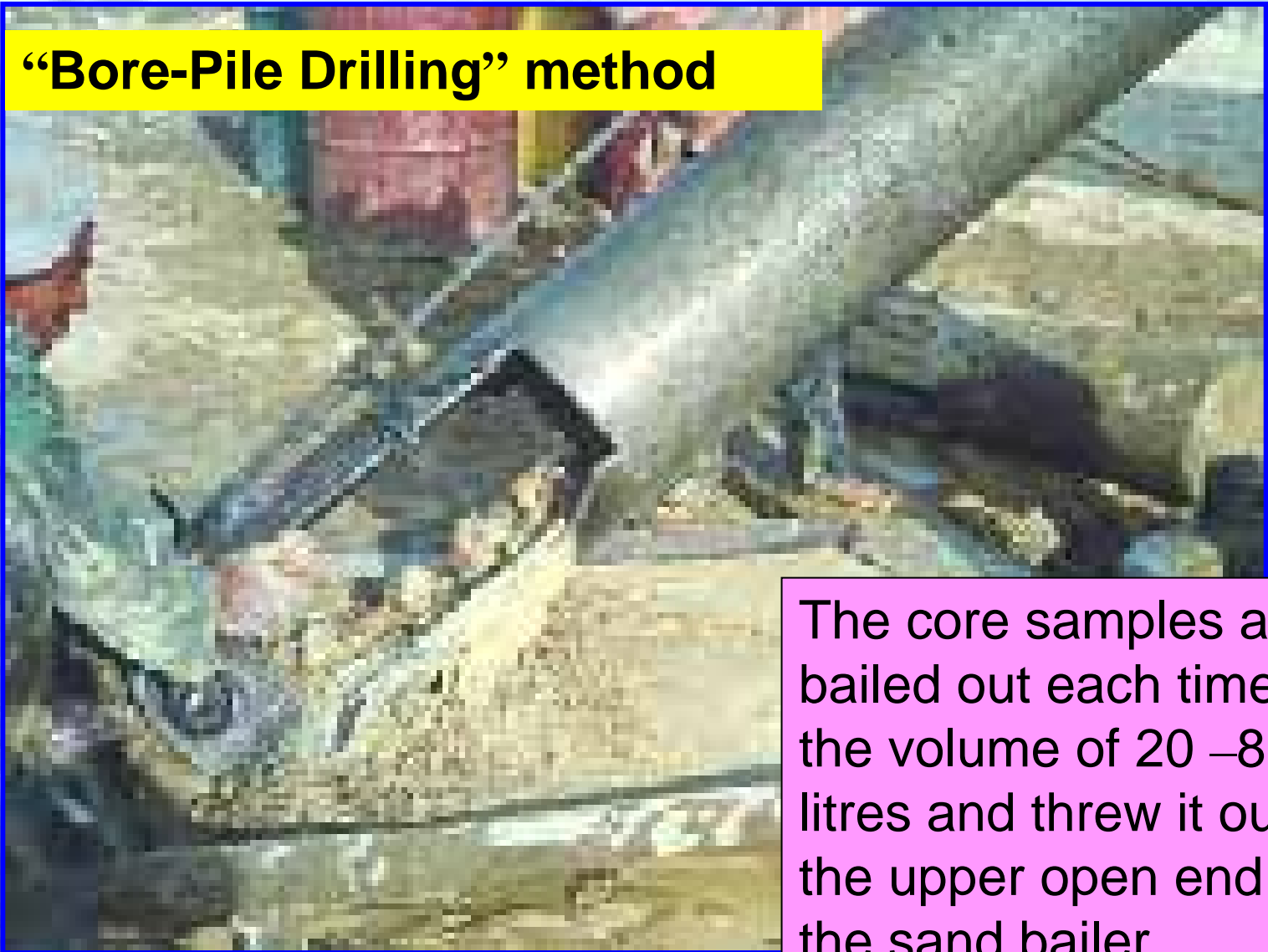
The first two casings with a special sharpened steel edge cutting shoe welded at the lower end is placed into the hole.



**“Bore-Pile Drilling” method
Bailing gravel bed layer by
sand bailer.**



“Bore-Pile Drilling” method



The core samples are bailed out each time with the volume of 20 –80 litres and threw it out on the upper open end of the sand bailer.

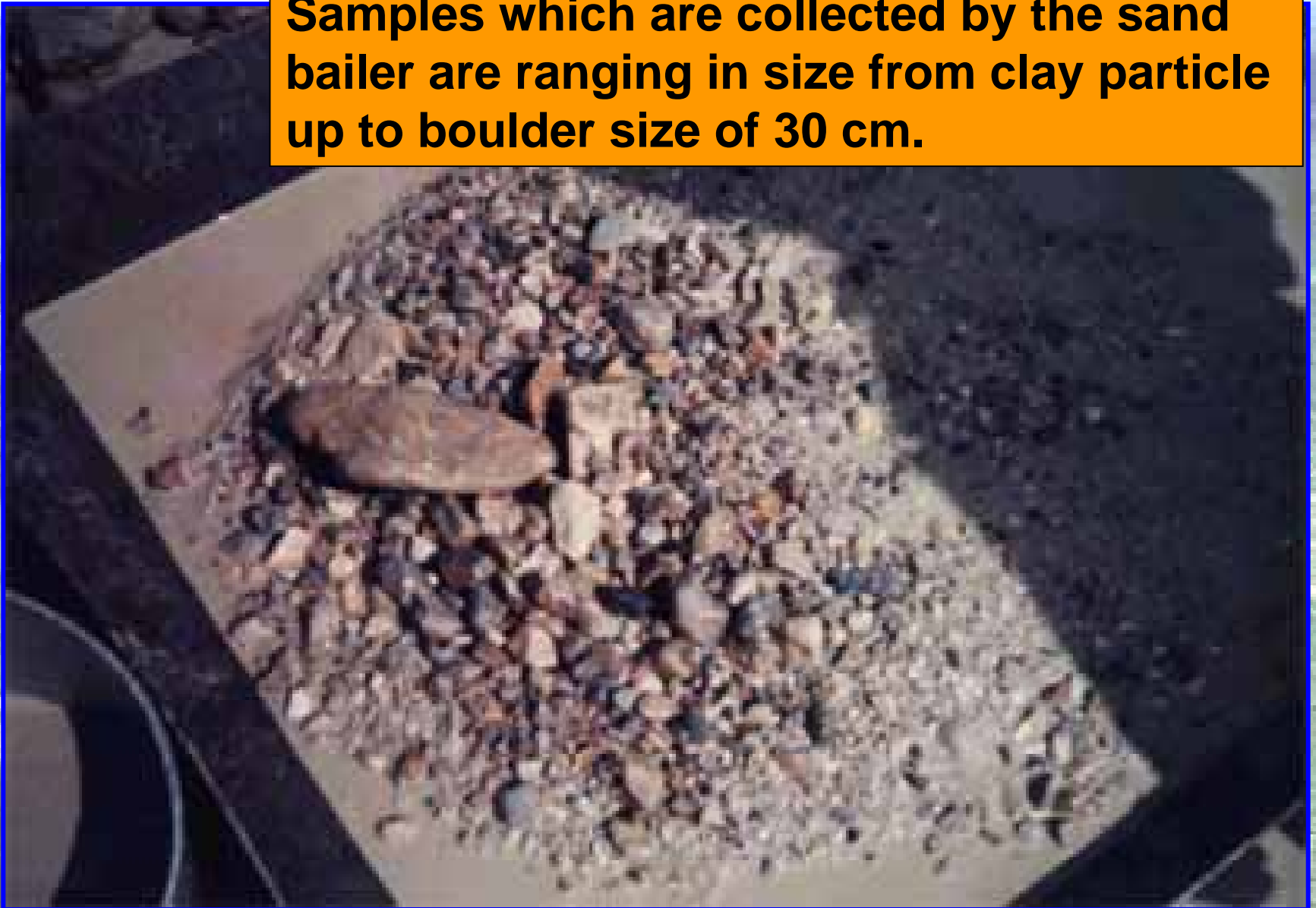


Samples which are collected by the sand bailer are ranging in size from clay particle up to boulder size of 30 cm.





Samples which are collected by the sand bailer are ranging in size from clay particle up to boulder size of 30 cm.







“Bore-Pile Drilling” method



The casing can be screwed together by coupling with the used of a cable wound round the casing and pulled in by the air winch or pulled out if disconnection is wanted.



“Bore-Pile Drilling” method

Using the hammer of 300 kgs. to break through the hard layer of secondary calcite which overlies the gemstone-bearing gravel bed on the western bank of Lam-Ta-Phoen.

(whereas the Banka drill is obstructed)





“Bore-Pile Drilling” method

The casings are withdrawn from the hole by using the pulley sets to help the winches in pulling.





The comparison of the Sample Collecting from both of the drilling methods



“ Banka drilling VS Bore-Pile drilling”



VS





The comparison of the Sample Collecting from the drilling method by “Banka & Bore-Pile Drilling”



Bore-Pile Drilling - Collecting samples are ranging in size from clay particle up to boulder size of 30 cm. with bulk sample from 1-3 cu.m.

Banka Drilling - The collecting biggest grain size of the samples are ϕ 2 inches with total volume of about 10-20 litres per hole.



The comparison of the drilling capability between “Banka-drilling” and “Bore-Pile drilling”

		DRILLING METHOD		
		General Description	Banka – drilling	Bore-Pile drilling
Instrument Details	Drilling power		Hand-operated	Engine
	Smallest casing diameter (inch)		4"	15"
	Biggest casing diameter (inch)		6"	30"
	Smallest bailer diameter (inch)		2.5"	12"
	Biggest bailer diameter (inch)		3"	20"
	Crew of full operation (men)		10	5
Drilling Details	Drilling action		Percussion&Rotar	Percussion
	Drilling media		y	Air & Water
	Hard rocks ability		Air &water	High
	Gravels and Boulders rich ability		Low	High
	Suitable depths (m.)		Low	30
	Rate of drilling (metre/hour)		30	1
			1	
Information Attained	Geological Information		Fair	Good
	Volume of sample		Poor	High
	Biggest of sample (inch)		2.5"	12"
	Mass recovery (gravels rich)		30-60%	>100%
	Disturbed sample		High	Low
	Surrounding sample.		Low	High
	Precise and accurate evaluation		Fair	Good
Operation Cost	Machine and Equipment		Low	High
	Drilling cost per Unit cost		High	Low
	Mobilization and Setting		Low	Uncertain
	Land preparation		Low	Uncertain



Samples analysis treatment



Samples analysis treatment

“The treatment is carried out together to the site with drilling rig”.





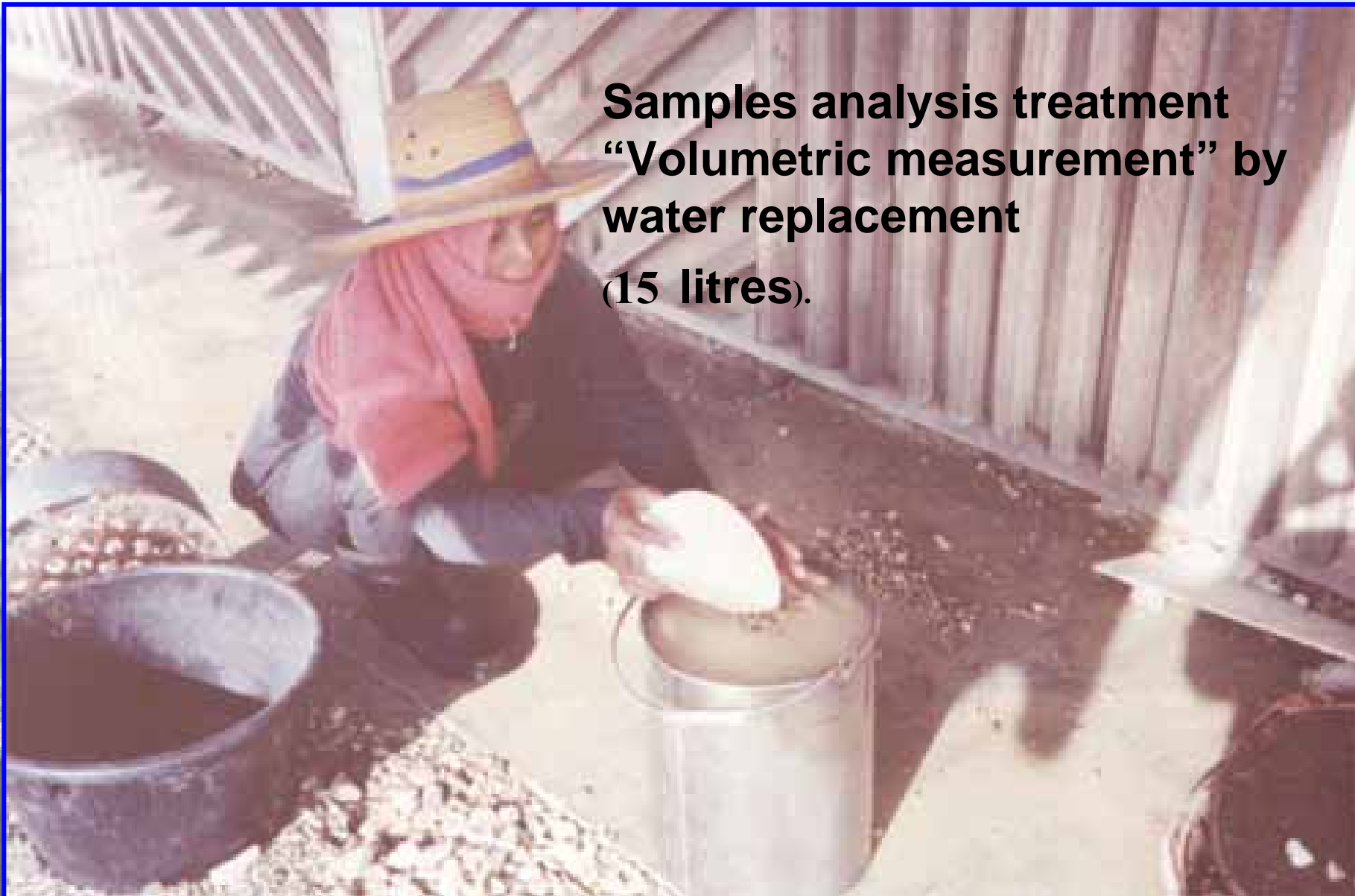
**Samples analysis treatment
“Weighting”**





Samples analysis treatment “Washing”

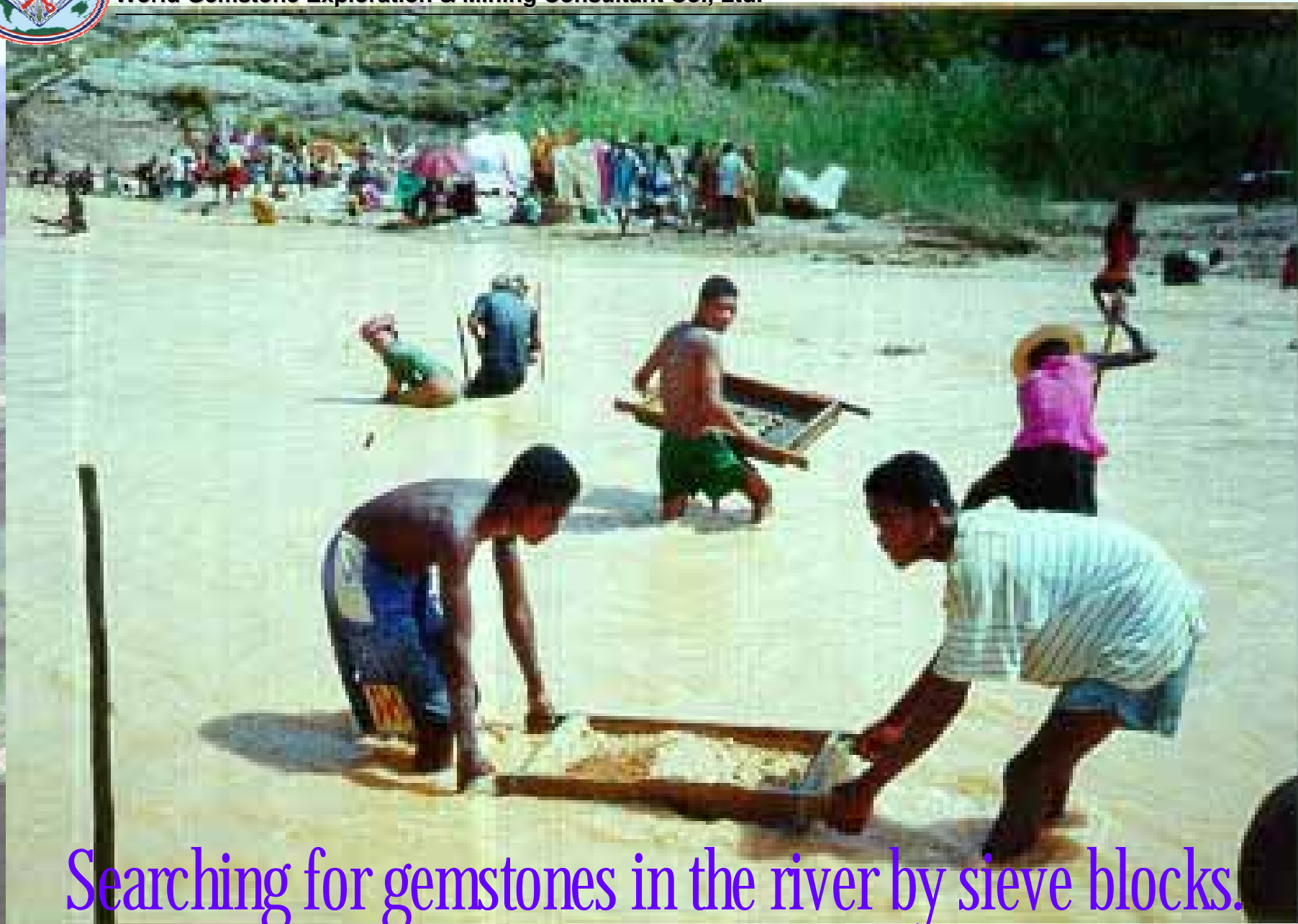




**Samples analysis treatment
“Volumetric measurement” by
water replacement
(15 litres).**



Samples analysis treatment
“Sorting” with the variety
sizes of sieve. 2”, 1”, 1/2”, 1/4”,
1/8” and etc.



Searching for gemstones in the river by sieve blocks.







14 9:44AM





14 9:46AM



World Gemstone Exploration & Mining Consultant Co., Ltd.



The 7th Annual CASM Conference, Ulaanbaatar – Mongolia, September 7th – 12th, 2007.



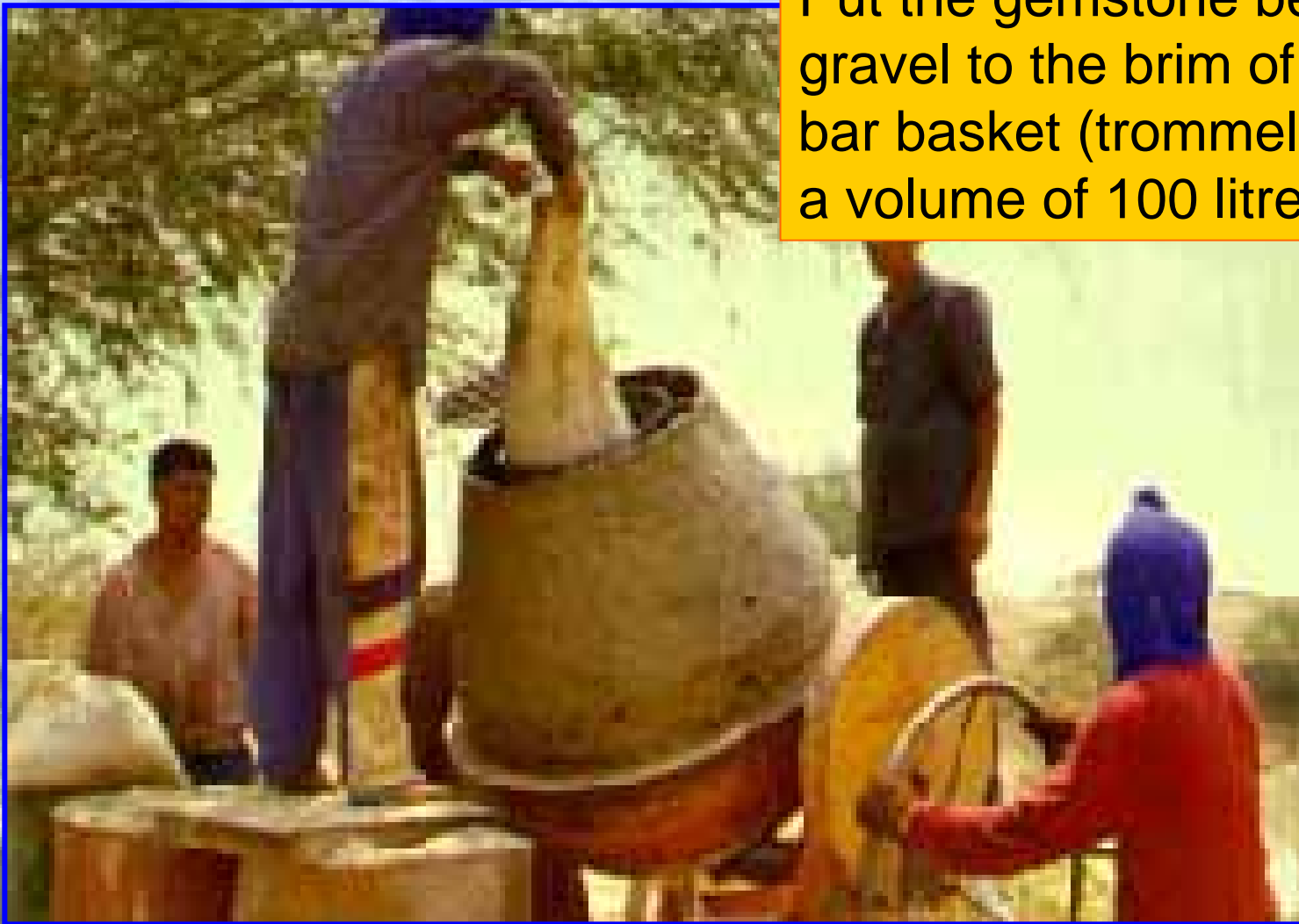


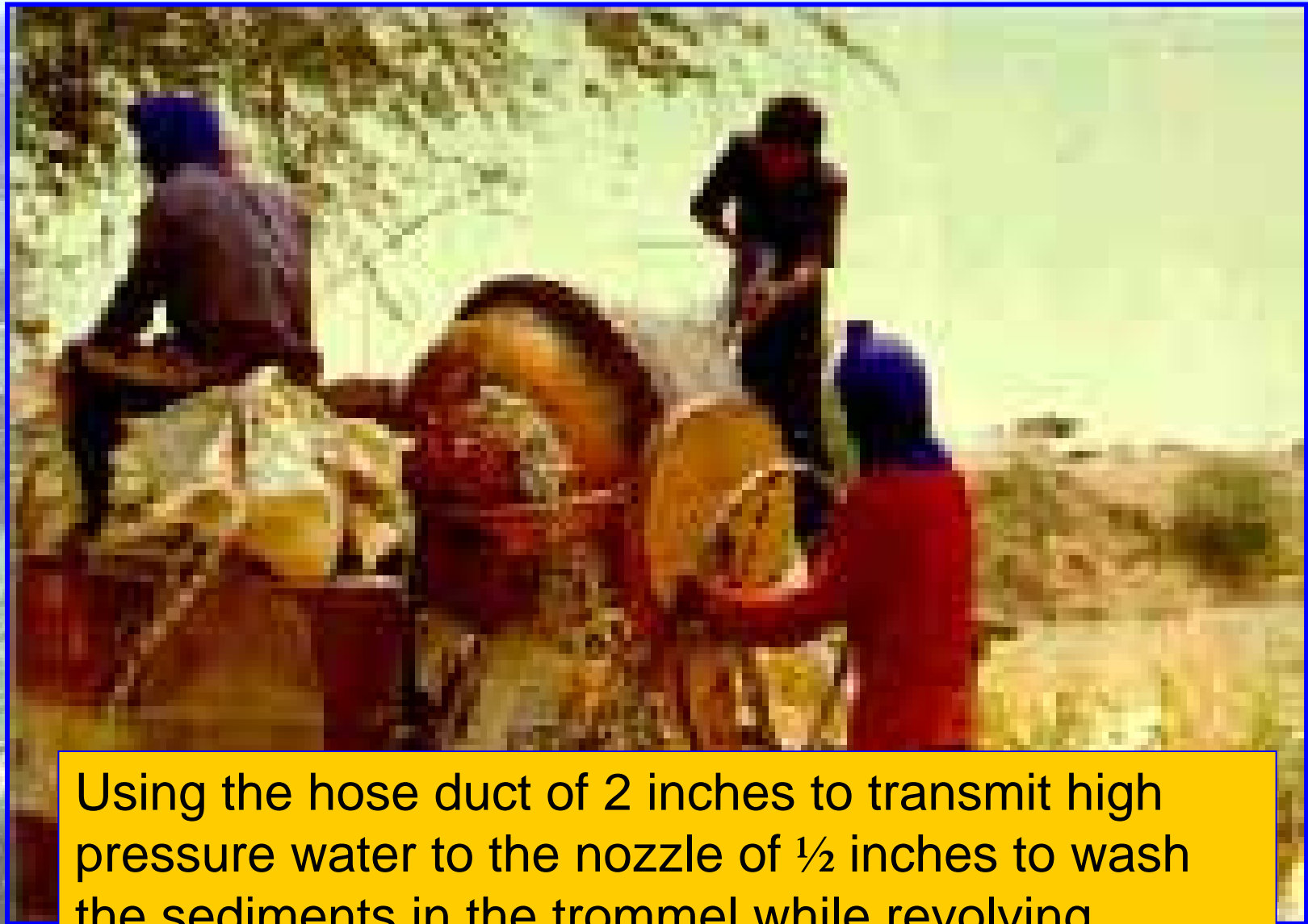
Special for Artisanal Gemstone Mining Entrepreneurs

“ Sorting Gemstone Bearing Gravel beds
by Concrete Mixer ”



Put the gemstone bearing gravel to the brim of the steel bar basket (trommel) which has a volume of 100 litres.





Using the hose duct of 2 inches to transmit high pressure water to the nozzle of ½ inches to wash the sediments in the trommel while revolving.

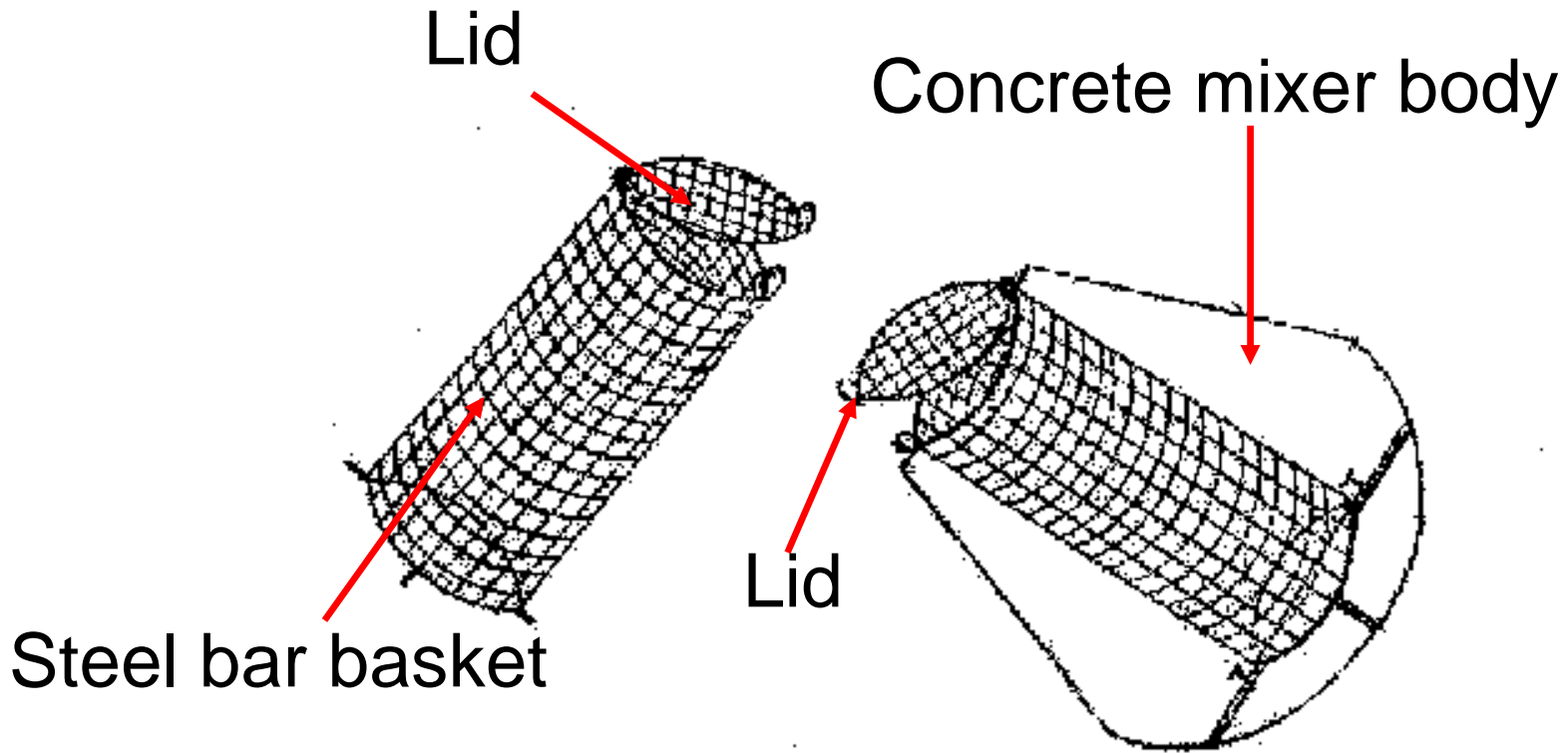


Throw the medium grain size sediments which are left in the concrete mixer body into the bucket.





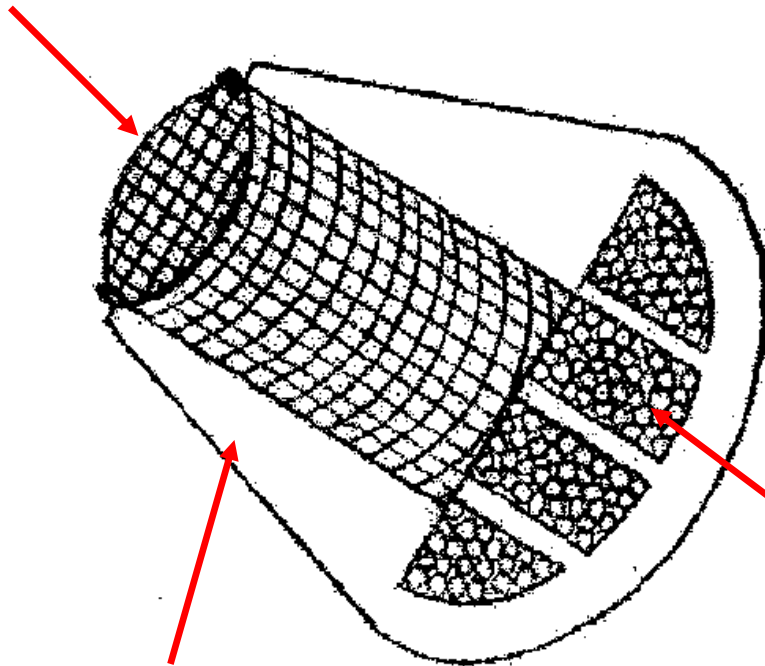
1. Install a cylindrical shape steel bar basket (trommel) in the concrete mixer body





2. Install a circular opening sieve

Steel bar basket and lid



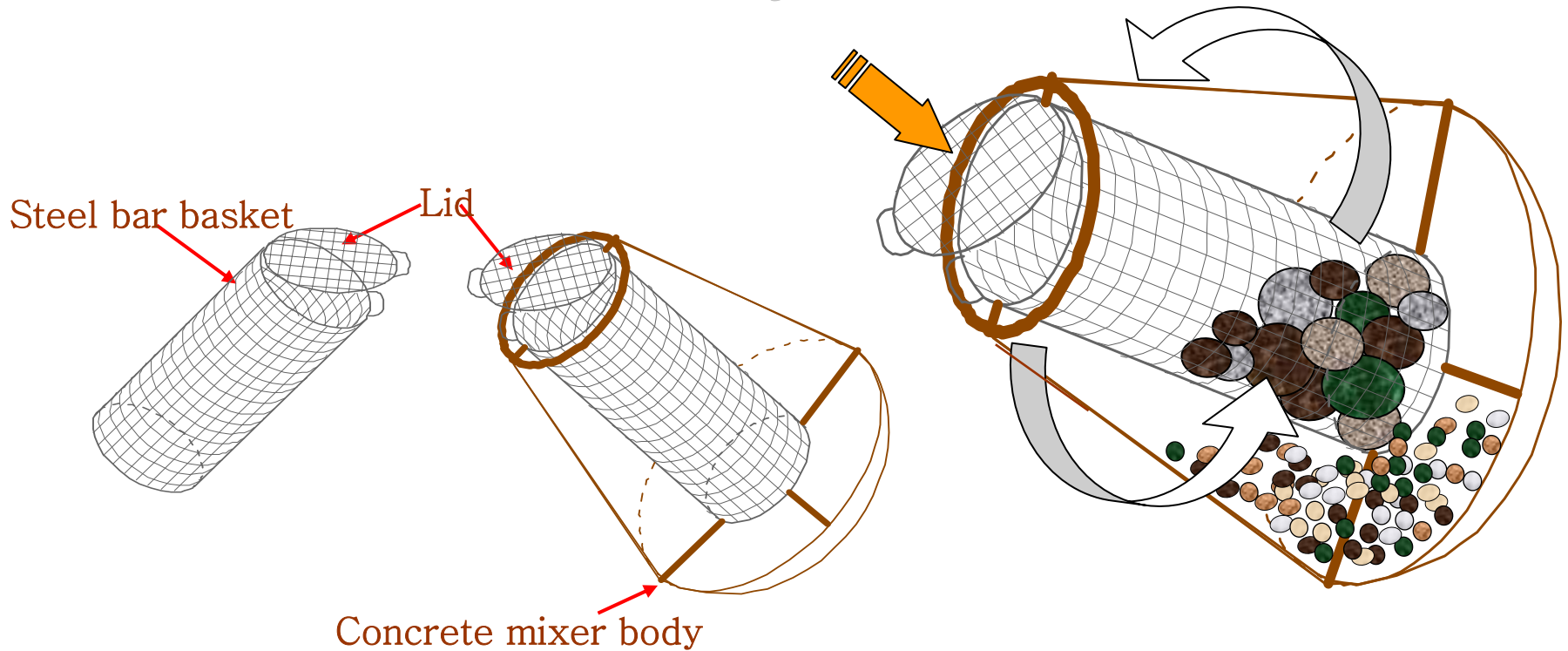
Install circular sieves replace the cut off space. Seize them with screw bolt for removing when want to change or when the holes are obstructed by the rock fragments or grass.

Circular sieve

Concrete mixer body

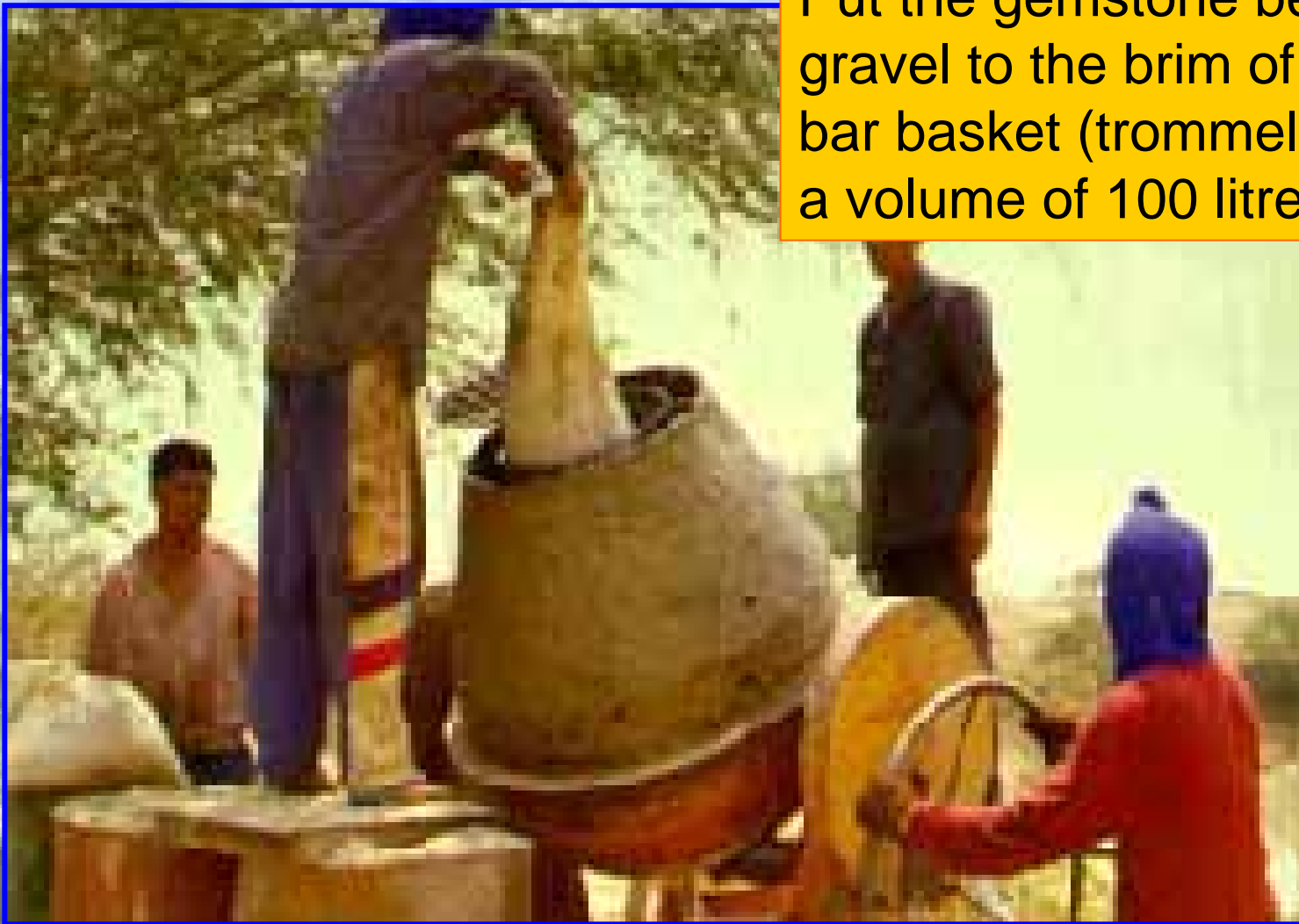


Install a cylindrical shape steel bar basket (trommel) in the concrete mixer body.





Put the gemstone bearing gravel to the brim of the steel bar basket (trommel) which has a volume of 100 litres.

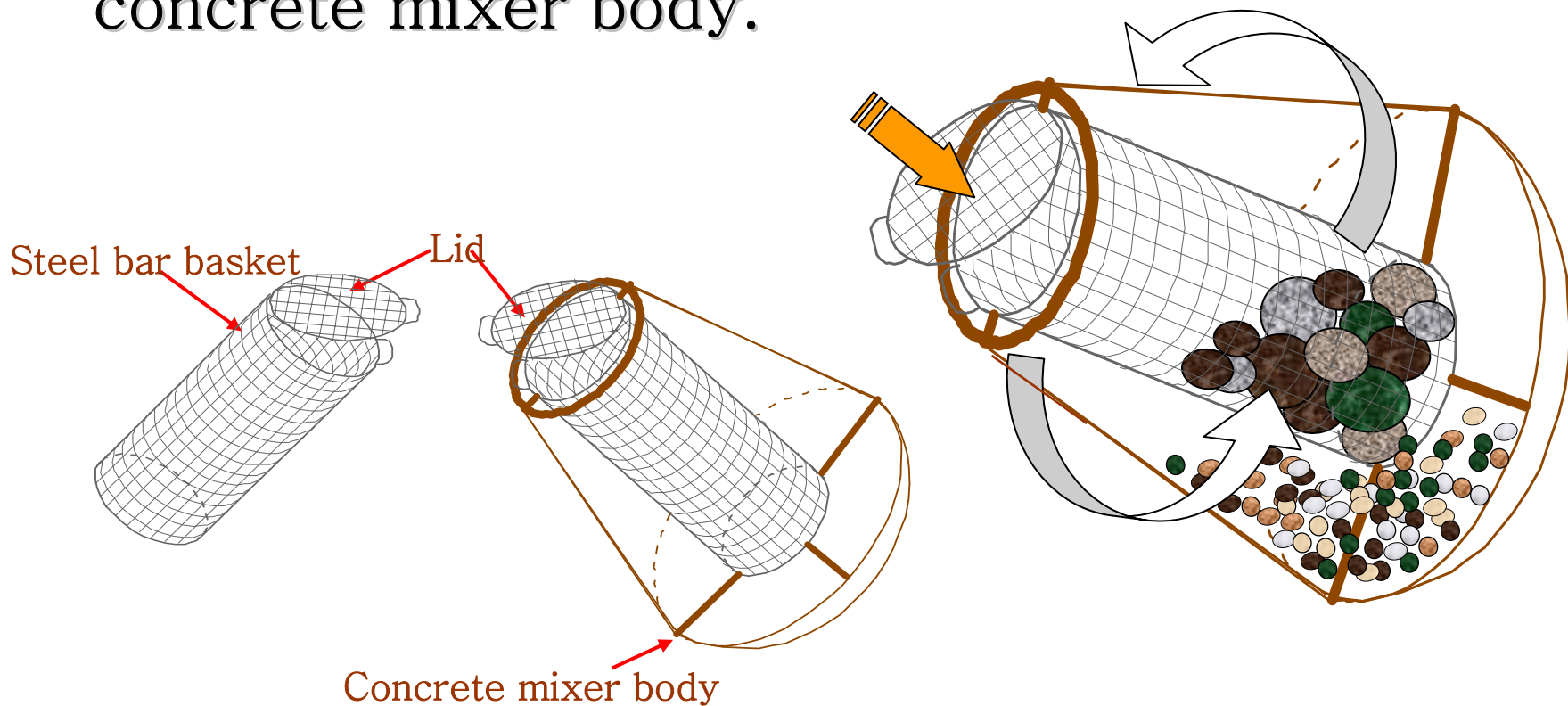




Using the hose duct of 2 inches to transmit high pressure water to the nozzle of ½ inches to wash the sediments in the trommel while revolving.



Install a cylindrical shape steel bar basket (trommel) in the concrete mixer body.





Throw the medium grain size sediments which are left in the concrete mixer body into the bucket.





Conclusions!!!!

Gemstone Mining in the Developing countries.

The main causes that obstruct the products :-

- 1.) The placer deposits of Gemstone and/or Gold buried beneath the surface beyond the manual mining operation can be done and/or under the ground water table.
- 2.) Lack the practical knowledge and experience of Exploration-drilling process.
- 3.) Lack of the practical equipment & machine in Exploration – drilling process. Used low efficient equipment & machine in exploration drilling. (>60 years have never been developed)



An important consideration used to better the Artisanal and Small-scale miner's life.

- 1.) Action Plan for Studying & Working (Researching) : "The Practicality knowledge and technology which best practice for the target areas".
- 2.) Action Plan for Supporting : "The Training courses of the Practicality knowledge and technology which best practice for the target areas.



An important consideration used to better the Artisanal and Small-scale miner's life.

3.) Action Plan for Supporting :

"The Practicality simplest machine and equipment which best practice for the target areas.

4.) Setting "One-Stop Service working Center" of knowledge and experience in the CASM target areas.

This report

FOR

All who learns to serve



World Gemstone Exploration & Mining Consultant Co., Ltd.

ขอกราบขอบพระคุณ!!
สวัสดี!!!! ครับ!!!!

Thank you for....
your Attention!!!!

The 7th Annual CASM Conference, Ulaanbaatar – Mongolia, September 7th – 12th, 2007.



Teedabae

My Mining - entrepreneurs

Many Thanks
Labae Mesaoja (Mada)
Azante sana (Tanz)



Goodbye!! Salama!!!!

Kwa heri!!!!!!!