

Attached Tables (Re: Article 4)

No. 1 Standards for Facilities

(Fundamentals of Red Soil Erosion Containment Facilities)

1 Red soil erosion containment facilities (hereinafter referred to as 'facilities') must be planned with the following guidelines:

(1) A thorough study of the environs of the project site to include rainwater drainage systems and route of erosion into public water areas, is required.

(2) Based on the study noted above in (1), the area of the project should be divided into sections based on rainwater pooling points so that red soil erosion countermeasures may be carried out rationally and effectively.

(Planning and Providing for Berm Construction)

2 Berm construction, implemented to maximize the impact and safety of the erosion containment facilities, should be provided under any well considered project plan in line with the following principles:

(1) Proper provisions should be made for the rainy season; weather conditions including mid- and long-range weather forecasts should be taken into consideration.

(2) In order to prevent exposure of bared grounds, it should be general practice to build berms one area at a time; a later area should be started upon completion of the preceding berm. However, construction of two areas at a time is allowed when there is a need to balance the amount of removed and filled soil between the two berms.

(3) Upon draft and implementation of berm construction, give consideration to minimizing the area of exposed groundwork. The multiple of the bare ground against the number of days that bare ground remains exposed, should be as small as possible.

(4) The amount of surplus soil resulting from the project should be as small as possible by working according to a soil management plan; this includes the soil transferred between construction areas.

(Standards for Slope Construction)

3. The construction of the face angles of earthen slopes must be preplanned to allow for structure safety and possible erosion by floods, by establishing and reinforcing the graduation of dirt layers.

(Components of the Structure)

4. The structure must comprise of the following:

(1) Provisions for eliminating structural erosion.

(2) Provisions to prevent water pollution resulting from flooding.

(3) Provisions for the final countermeasures of water pollution.

(Definition of "Provisions")

5. The definition of the term "provisions" as noted in 4 above, is explained in the following:

(1) Provisions to eliminate erosion include the following devices used to cover the denuded surface which will prevent the red soil being carried off by water from its point of origin, strengthen the stability of the earth and promote non-permeability of water.

{1} Provisions that maintain soil surfaces (including spreading of sand, planting vegetation, seeds, and soil solidification solutions).

{2} Auxiliary provisions that maintain soil surfaces (including sheeting, grass-overs, and spreading asphalt emulsifiers).

(2) The provisions to prevent water pollution by flooding should include such techniques as outlined below, the purposes of which are to decrease the flow speeds of polluted waters, and measure the flow rate of the underground water and still (not moving) polluted waters at the origin of the pollution and its vicinities. These techniques should also decrease the volume per hour of the treatment at the final sedimentation pool stage while promoting the precipitation of the removed red soils, thus preventing a pollution chain-reaction coming from secondary overflow. This is done by restricting the polluted waters flow from rainwater and other sources in the areas around the work site.

{1} Prevention of flowever and containing drainage paths (including steps, waterways to collect runoffs, fencing and baskets, and overflow prevention banks).

{2} Techniques to prevent inflow from underground water originating from areas other than the work site (including water diversion routes).

{3} Dams, balks and footpaths (partitioning the water by erecting balks and footpaths, and promoting the underground permeation and pooling at the origin of the erosion).

(3) Provisions for final stage treatment of polluted waters that include the following to pool and treat polluted waters that naturally and/or artificially precipitate and finally discharge treated water into the public waterways after straining.

{1} Provision for final stage of precipitation and discharge (includes any device that will promote precipitation at the final stage and other devices).

{2} Provisions to prevent diffusion (a sheet pile partition located at a underwater or waterfront construction site, or other auxiliary device for overflow and fencing used to prevent pollution.).

(Standards for the Equipment)

6. Following items are the standards for the provisions listed above in 5.

(1) Provisions to prevent pollution the site.

{1} Provisions to maintain soil surface soil, and related devices.

(a) Provisions to maintain soil surfaces should be applied as soon as possible to exposed soil areas. However, when work exposing soil surfaces is not yet complete, auxiliary surface protection must be applied as soon as possible to the slope and to flat ground. Application of roller pressure is sufficient on exposed surfaces before the construction work for the day is over.

(b) Despite item (a) above, when exposed surface soils are on land used for farming and these same exposures are partitioned by crossed balks and footpaths, which standing regulations required only to be covered with grass, it will suffice to apply grass covering to the exposed ground..

(c) If and when the red soils are to be deposited temporarily at a site, the auxiliary surface maintenance equipment shall be applied as soon as possible.

(d) In applying the surface soil protection provision or similar methods except as defined in (b) above on ground used to cultivate farm products, the slopes of the

banks must first be applied with slope protection boards and cross-partitioned, then pressed with rollers. Roller pressure must also be applied to other denuded surface soils; however, where the process is made difficult because of the soil composition, as in the case of limestone areas where rainwater easily permeates underground, the requirement for cross-partitions and roller pressure can be if these areas are partitioned by balks and footpaths.

(e) Standards for other provisions to prevent pollution at points of origin are in the appended tables.

{2} Despite item {1} above for underwater or waterfront construction, requirements may be satisfied by setting up provisions to prevent polluted water infiltration as stipulated in {3}, the final stage of treatment of polluted water equipment.

(2) Equipment for the countermeasures for polluted water overflow.

{1} Containing water flow and providing paths for water drainage

{a} Overflow control and waterways provisions shall include steps, waterways, fencing and buckets and/or the combination of these. All can be considered for appropriate use on the site. Such provisions may be provided as work progresses. For steps where the slope under 2 degrees, the same equipment shall be set up at approximately every 40 meters of the slope lengths, and in the case of slopes that are more than 2 degrees, provisions shall be made at approximately every 30 meters of the slope on the contour line. The number of steps on the exposed surfaces shall be increased where the slope exceeds 3 degrees.

{b} As for the work on slope faces, the standard procedures shall be to place small steps along with cross-partitions parallel to the slope shoulders and slope edges. In the case of step-studded slopes, small small steps on the slopes and shoulders shall be installed as the cross-partition work progresses.

{c} For any exposed surfaces used for vehicle movement, slopes shall be installed at the waterways parallel with the direction of the traffic. Where the denuded surface grounds abut the hillside slope on one side, the waterways and the slopes of the surface ground should be made on the hillside.

{d} On work sites where the embankment are to be built in the valley gutter, the principal technique shall be to first erect earthen embankments through the reverse-push fill method. Efforts shall be made to prevent outflow of polluted waters directly from the groundwork site. The purpose of erecting earthen weirs and other embankments, is to promote the natural precipitation of the red soil particles from the pooled polluted waters and also to promote the drainage of waters outside the embankment.

{2} Provisions to prevent inflow of waters originating from other sources. Waterways to divert such waters should be constructed prior to building needed berms, in order to prevent the mixture of polluted waters with groundwater oozing from ground.

{3} Provisions for berms, balks and footpaths. Such provisions are best for grounds composed of limestone, small-scale temporarily area developments, or farmland where underground precipitation is relatively easy to achieve through collection pools near the origin of polluted waters.

{4} Standards for other provisions used to prevent outflow of polluted waters are listed in the attached table.

(3) Provisions for final stage treatment of polluted waters.

{1} Provisions for final stage precipitation and drainage.

(a) The provisions for a final stage precipitation and drainage must be made prior to the start of the berm proper.

(b) Provisions should include a polluted water storage tank of more than 150 cubic meters for every 1,000 square meters of exposed surface area of the berms. However, areas where surface soil protection measures are taken (such areas must be limited to work sites where soil erosion is unlikely because of grass seeding or properly completed ground cover vegetation) as well as where rain fall on the work area is drained through provisions to prevent overflow of water seeping from the site, should allow the acreage of the denuded surface to be deducted from the surface protection measures which are carried out.

(c) Despite the item (b) above, countermeasures for the purpose of this regulation can be done according to the following {a}, {b}, or {c}.

{a} For the denuded soils or the areas partly denuded, and polluted waters are stored within the site through digging a gutter, the storage capacity of the tank can be added to the minimum capacities mentioned in the above {b}.

{b} If and when the provisions may use natural materials to strain polluted waters containing red soils and the like, filtering the polluted waters and facilitating the sedimentation of the floating particles, are required to meet the standards, with a slight exceptions allowed, then the minimum requirements as stipulated in {b} may be reduced. In such cases, calculation of the capacity of the preventative measures must be based on a 2 year probable rainfall density.

{c} In the case of the provisions to reduce the treatment volume per hour, of the flottage particles in waters from other sources to levels that meet the stipulated standards, then the minimal requirement capacities as stipulated in b, may be reduced. In calculating the capacities in this case, 2 year probable rainfall density must be considered.

2} Provisions to prevent diffusion of polluted waters. Provisions must be made for underwater and/or waterfront berm .

3} The standards for other equipment for the final stage treatment of the polluted waters are listed in the attached tables.

No. 2. Standards for Control.

Facilities for the prevention of red soil erosions should meet the following standards in line with the standards for the provisions delineated above, so that such facilities will function to their full extent.

(Standards for the drainage of polluted waters)

1. When providing for final stage precipitation and drainage based on {1},{3}, of item 6 (including cofferdams, balks and footpaths, reverse-push filling-up method and the like, for storage of underground water and the overflow containing the red soil), the water thus collected shall be drained containing less than 200 g/l of the flottage particles.

(Drainage of polluted waters and drainage time)

2. The flow out of polluted waters based on the drainage standard 1, must be carried out as soon as the concerned polluted waters precipitate naturally and the contents of the flottage particles dropped below 200mg/l .

(Exception to the Drainage of Polluted Waters)

3. Despite item 2, if and when a berm is made by reclaiming the land worked or administering the last stage underground precipitation method according to the item 6, of {3},{1}, c, and {a}, of the facility standard, and the polluted water is stored in the

depressions made through the reverse-push filling-up method, these pools of polluted water may not be discharged.

(Measurement of the particle density)

4. To drain polluted water, particle density must be measured in the water to be drained and recorded. In this case the simple method should be adopted through the use of transparency measurement.

(Field inspection for rainfall etc.)

5. When rain is anticipated or during rainfalls, the controller of the prevention of the overflow of red soils and the like, shall conduct a field inspection of the site, record the findings on the attached form No 2, and submit the same to the person in charge of the prevention of the red soil overflow.

(Measures for Improvement)

6. When anything unusual is found during the inspection conducted according to the above 5, both the controller of the prevention of the overflow of red soils as well as the person in charge of the prevention of the red soils should immediately correct the situation.

(Measures for an emergency and report of the findings)

7. If and when the facilities for the prevention of the red soil overflow are damaged due to a disaster, an emergency measures should be taken without losing time; the facts should be reported to a concerned public health center by using the attached form No. 3 and the governor of Okinawa also must be notified via the public health center.

(Clearance of the piled-up red soil. etc.)

8. Red soil piles and the like (excluding accumulations in devices for the prevention of diffusion of the polluted waters), must be removed immediately after draining. However, if red soil is held in the depressed areas between the banks and the embankments due to the operation of equipment for making balks and footpaths, and if the function of the facilities are clearly not obstructed, then the removal of the red soil from the site may be omitted within the areas. Furthermore, the red soil accumulated within the devices for the prevention of diffusion of the polluted waters shall be cleared, based on the report of the facts submitted to the governor.

(Treatment of the removed red soils, etc.)

9. Proper care must be taken to deal with red soil removed from the facilities, to best prevent further erosion of the red soil.

Attached Table

Devices		Criteria	Notes	
1 Erosion Measure- ment Device (at Erosion Source)	(1) Surface Protection Devices	A. Tree- planting by seedlings	(a) Select plants expected to show an early covering effect (b) When a slope is to be covered, provide against seeds flowing off the slope. (c) See civil engineering references on standard specifications and agriculture and standard forestry specifications for other criteria for planting using seedling trees.	This device is aimed at bare ground areas that need early tree-planting.
		B. Tree- planting by vegetation	(a) Employ construction methods appropriate to sea breeze and soil conditions. (b) See civil engineering references on standard specifications and agriculture and standard forestry specifications for other criteria for ground cover vegetation.	(a) This device is aimed at bare ground areas needing natural reforestation. (b) Usable removed surface soil should be recycled as base material.
		C. Applying soil crusher	(a) Employ a soil crusher approved and certified as safe by recognized authorities, which will not negatively impact on the environment. (b) As a general rule, sprinkle seeds at the same time. (c) See standard specifications on soil crushing and seed sprinkling for appropriate volumes.	This device is aimed at flat bare grounds, cut or raised slopes.
		D. Area covering with gravel	(a) Use gravel or unscreened crushed stone. (b) See civil engineering references on standard specifications and agriculture and standard forestry specifications for other criteria for gravel covering.	This device is aimed at bare grounds, such as prospective site for roads, which are not suited for tree-planting.
		E. Spraying mortar/ concrete, stone pitching, block piling, etc.	See civil engineering references on standard specifications and agriculture and standard forestry specifications for other criteria.	(a) These devices are aimed at all areas unsuited to use of devices A-D devices above, excepting areas where falling rocks are not anticipated or areas devoid of threat of erosion. (b) As a general rule, these devices should be minimized and tree-planting should be taken as the top priority.
	(2) Temporary Surface	A. Using sheet covering	(a) Each area to be covered should be small enough to be managed. (b) Sheets should not be water-permeable.	(a) If water runs too fast on a sheet, use with other restraint device. (b) Use sandbags to hold down sheets.
		B. Mulching (laying grass, etc.)	(a) Mulching material should be natural such as Japanese pampas grass, and branches and leaves of trees; or material that does not negatively impact the environment. (b) Thickness of layer should be approximately 3 cm.	(a) This device is aimed at flat land cultivated for agricultural use. (b) In case of strong wind and rain, use a net together with mulch as required in order to prevent scatter and overflow. (c) Inclination of slope should be approximately 5°.
		C. Spraying asphalt emulsion	(a) Asphalt emulsion should meet JISK2208 standard. (b) When spraying a slope, treat oil at the toe of slope as necessary in order to	This device should not be completed with only one spraying. Careful follow-up such as spraying again should be done when minimal effect is expected.

2
Device
for
Meas-
uring
Muddy
Water
Erosion

Erosion
Restraint
Device and
Watercourse
Device

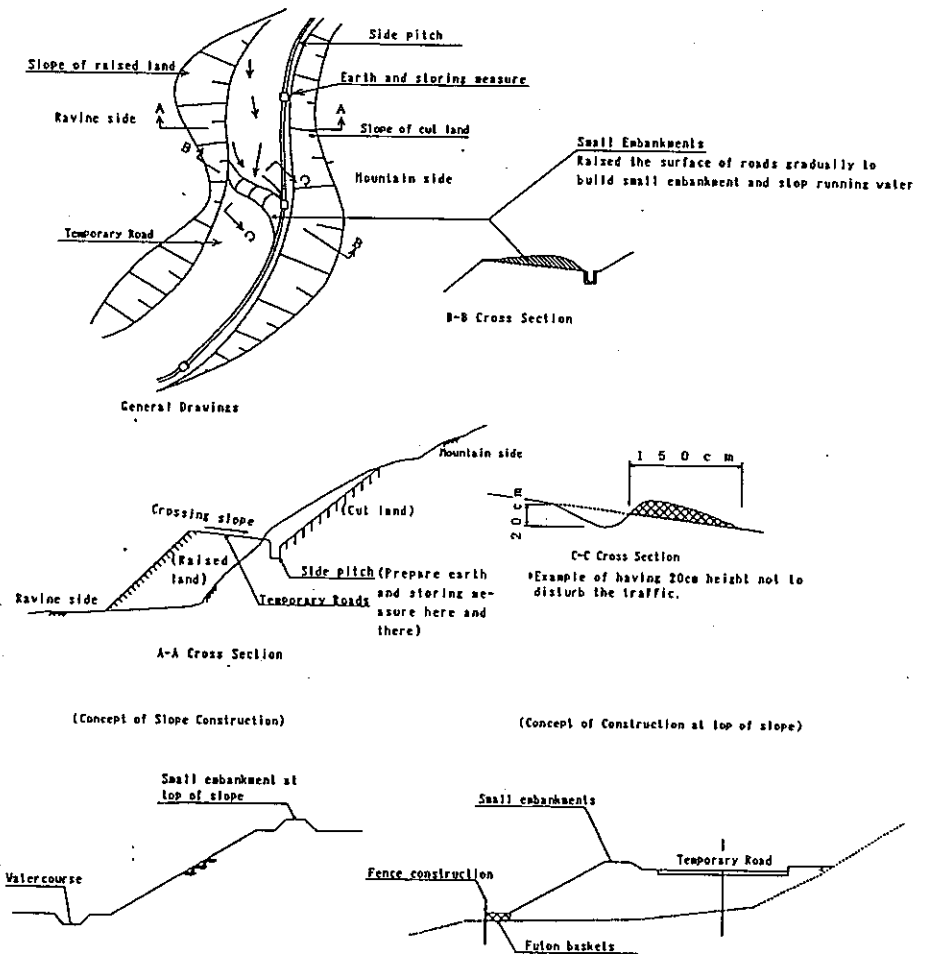
A.
Small
embankment
device

prevent oil erosion.
(c) See civil engineering references on standard specifications and agriculture and standard forestry specifications for other criteria on spraying asphalt emulsion.

(a) As a general rule, the embankment should be made of soil.
(b) The form of the embankment should suit the condition of the site to attain ample erosion restraint effect.
(c) When employing this device at temporary roads, try not to disturb the traffic by, for example, building embankments diagonally to the traffic direction.

(a) This device is aimed at all groundwork area.
(b) The main purpose of the device is to slow the speed of water moving over land.
(c) The embankment can be replaced with watercourse system such as a water crossing.
(d) When employing this device at temporary roads, cure the surface of the roads so that they will not cave in from traffic weight.
(e) Prepare a storing measure at the end of the water course to collect earth as well as sand and to slow down the running speed of muddy water.
(f) The construction concepts are as follows:

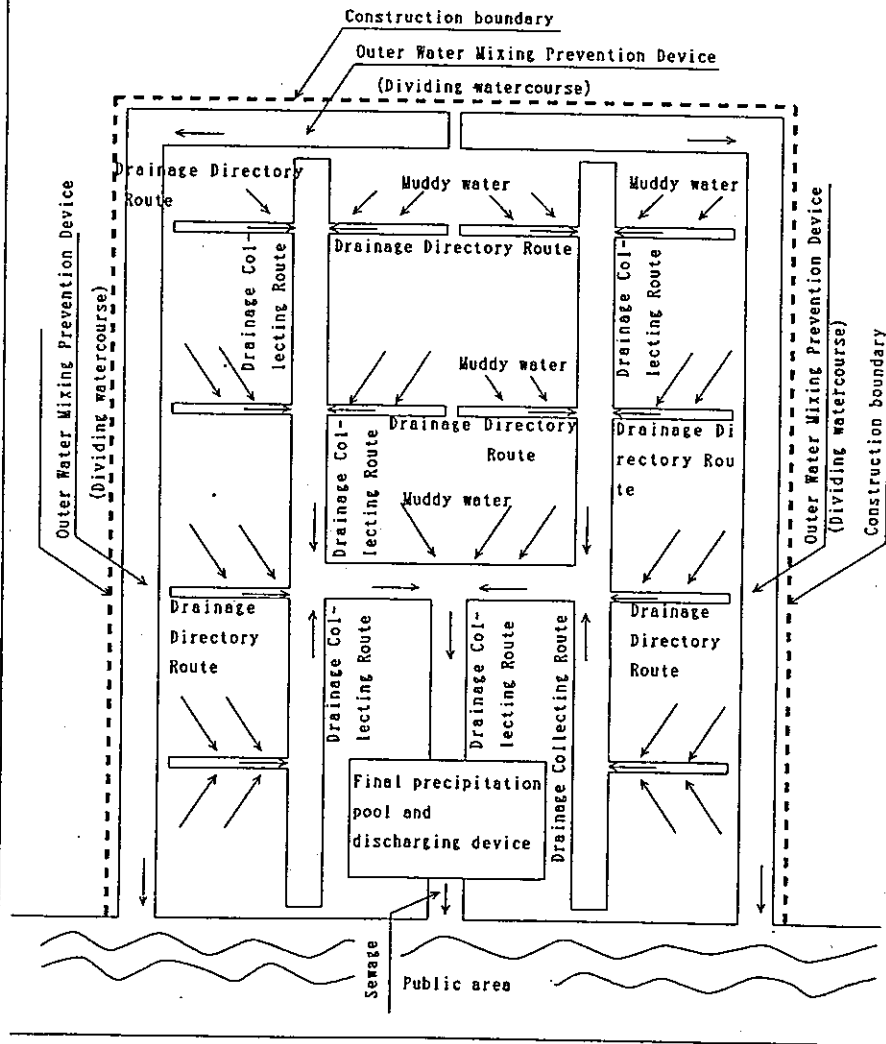
Concepts of Road Construction



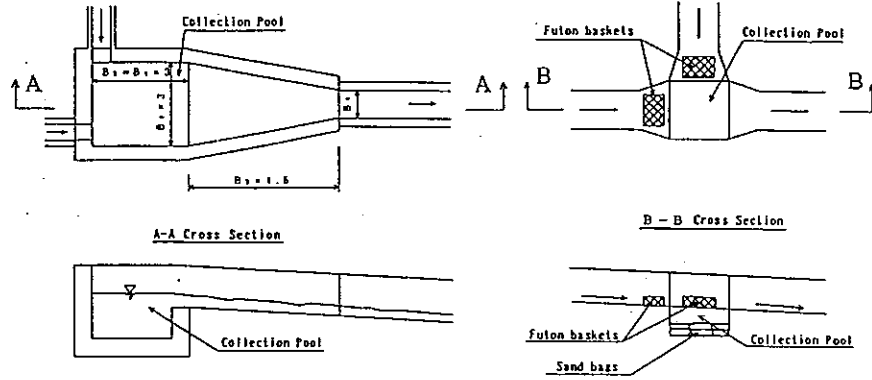
B. Watercourse (Drainage Directory Route and Drainage Collecting Route) device

(a) The position and structure of the device should be determined based on careful topographical surveys so that erosion muddy water will be restrained, received, collected, and led to final sedimentation device most effectively, meeting condition changes of the site.
(b) Permeability of the device should be calculated based on two-year rainfall probability strength, provided that, enough permeability will be set when, due to long-term use, there is a threat of overflow by the environmental condition.
(c) Basically, the device should be excavated without timbering.
(d) Careful consideration should be given to deceleration factors at the device's connection point to drainage collecting route, joining point of the watercourses, curved point of the watercourse, inflection point of rapid current.

(a) This device is aimed at berm construction.
(b) The device should be cared for erosion restraint by, for example, covering with sheets.
(c) The construction concepts are as follows:



(Construction Concept at reduced current speed)



* This diagram shows the general concept of construction cases. At construction sites, staff are to refer to this diagram, adding an effective method to reduce current speed.

C. Fences and baskets device

(a) Material for these devices should be effective in reducing particle density.
 (b) As for other fence and basket devices, refer to standardized civil engineering construction specifications and agricultural/forest construction standard specifications.

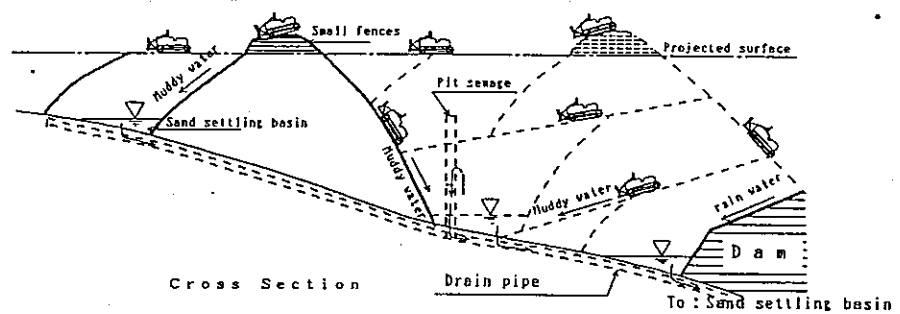
Used as supplementary devices for permanent and temporary surface preservation devices. Also used when there is risk of leak, erosion, or corruption at the foot of a slope, a stream, or construction boundaries caused by construction.

D. Reverse land-raising device

(a) Devices should be constructed by land-raising techniques with a dam at the lower reaches of the river. Leveling between raised lands should accompany discharging slopes at the upper reaches of the river.
 (b) Muddy water pooled in the dam should basically be drained through the pit or the underdrain sewage.

(a) If the same effect as the mentioned devices is expected, standard land-raising can be applied.
 (b) Below is the diagram of the construction concept.

(Construction Concept)



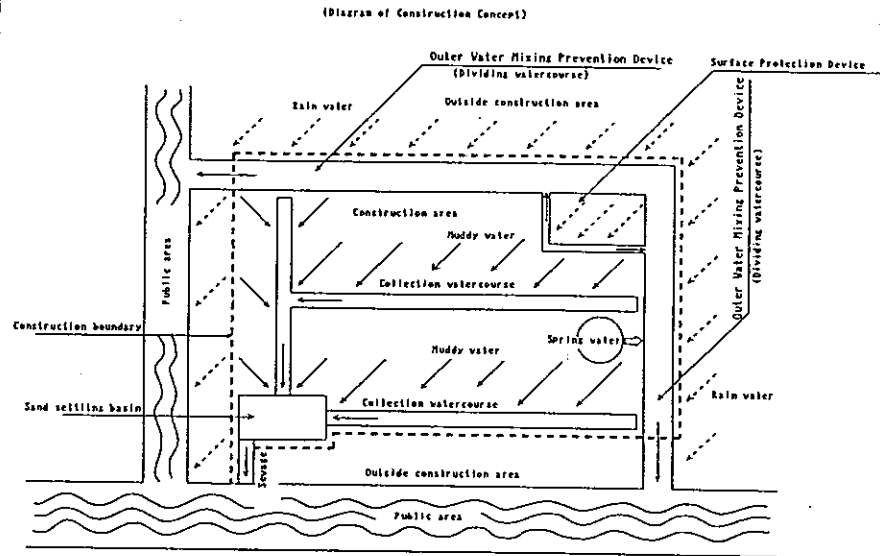
(2) Outer water mixing Prevention Devices

Dividing watercourse device

(a) As a general rule, devices function as drainage for clean water and should be discharged directly to outer construction area, not through final settling basin.
 (b) As for other dividing watercourses, refer to standards for devices in #1.

(a) Install within construction area where rain water is expected to flow in.
 (b) Spring water in the construction area should also be discharged through the devices to the outer construction area.
 (c) Outflow from lands where surface

preservation device is installed (if seeding is conducted, only where no risk of red soil erosion is expected because of the green plant growth), can be directly poured into the mixing prevention devices. (d) When installation is extremely difficult, owing to geographical features, small fences can be used as substitution. (e) Construction concept is as follows:



(3) Closed Ridge Device	Closed ridge device	<p>(a) Standard form of devices are set for: height more than 30 cm, width more than 30 cm, slope 1:1.</p> <p>(b) Ridges should be installed around cultivated land.</p>	<p>(a) Required for cultivated lands within agricultural land maintenance project and small temporary development area.</p> <p>(b) In order to prevent scouring by water overflow, strengthen ridges and then seed the surface or plant trees.</p>
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3. Final Trea- tment of Muddy Water	(1) Final Precipi- tation and Discharging Device	Final precipi- tation and discharging device	<p>(a) Install devices at the most effective position, based on examination of the shape, water collection, and sewage systems of a projected land.</p> <p>(b) As a general rule, make the landform easier for excavation without timbering.</p> <p>(c) When using chemicals like cohesives, use one with certified security by a testing and research institution, and also refer to standard specifications to avoid unfavorable effects on the environment.</p> <p>(d) For standards of other final settling basin and construction, refer to agricultural and forest construction.</p>	<p>(a) The vicinity surrounding the settling basin should be arranged to facilitate removal of accumulated sand.</p> <p>(b) For precipitation using chemicals like cohesives or natural and artificial filtration system, refer to appropriate specifications.</p>
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(2) Muddy water Diffusion Prevention Device	Muddy water diffusion prevention device	<p>(a) Devices should have the structure to match the project site. Apply necessary prevention devices when there is a risk of muddy water erosion.</p> <p>(b) As to standards of other devices to</p>	<p>(a) Subjects are in- and by-water constructions at rivers and harbors.</p> <p>(b) When removing a device which has pollution prevention membrane attached, remove the main device first and then the</p>
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		prevent muddy water diffusion, refer to standardized construction specifications and standardized agricultural/forest specifications.	attached membrane.
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Attached No. 2

Round of Inspection

1. Name of Project

2. Name of Inspector

3. Date

4. Weather

5. Result of Inspection

(1) Source Countermeasure Device

Countermeasure: Good/Average/Need Improvement()

(2) Muddy water erosion Countermeasure Device

Countermeasure: Good/Average/Need Improvement()

(3) Final Treatment Device of Muddy water

Countermeasure: Good/Average/Need Improvement()

(4) Other (

) Countermeasure: Good/Average/Need Improvement()

Summary Round of Inspection

6. Improvements

Name of Supervisor of Red Soil Erosion Prevention

Seal

Attached No.1

Floating Materials Measurement Record

1. Project Name
2. Name of Examiner
3. Date of Examination
4. Weather
5. Method of measurement
6. Results

Site of Measurement	Time	Floating materials, particle density and transparency(unit)	Final precipitation pool and discharge devices
Sketch of construction point		Summary	
Red Soil Erosion Prevention Supervisor Name			Seal

Public Report

Attached Document No. 3

To: Governor, Okinawa Prefecture

Report on Emergency Countermeasures

Concerning the title above, we hereby report on the following items, based on the regulation (7) of Red Soil Erosion Prevention Facilities Control Standards.

1. Name of the Company.

2. Address.

3. Name of the person in charge of the Red Soil Erosion Prevention Countermeasures.

Seal

Name of the manager for the Red Soil Erosion Countermeasures.

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4. Date of the damage done to the facilities by a disaster.

5. Extent of damage incurred and its cause.

6. Outline of the emergency measures taken.

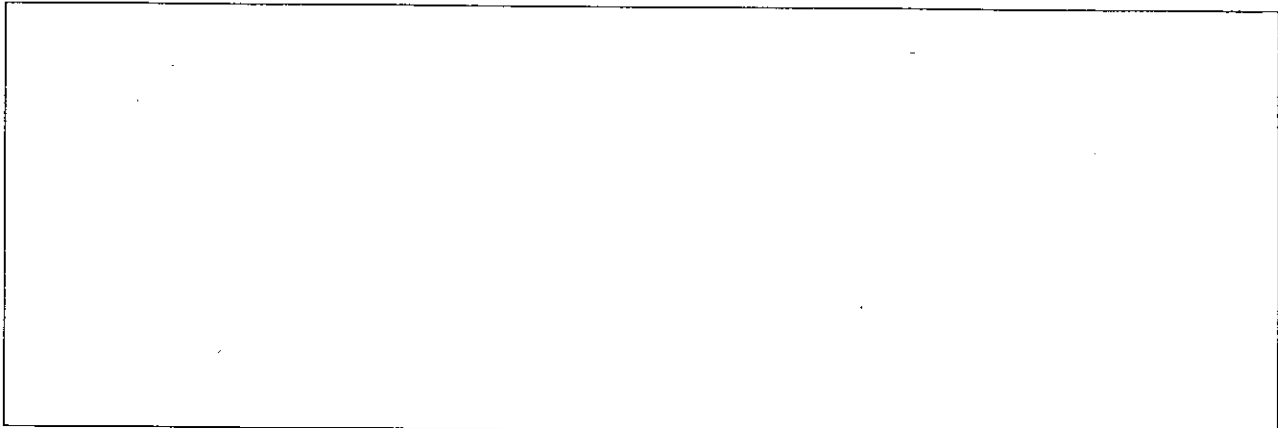
7. Results of the emergency measures.

8. Is there attached document? (Yes, No)

(1) The Measurement Record of Flootation Particles (attached document No. 1) and a copy of the Field Work Inspection table (attached document No. 2).

(2) Other related materials.

9. Drawing of the site concerned; indicating the damaged part/parts.



10. Remarks

