資料 2

スリランカ側へ提供した
カワシマ設備資料

資料 2-1　プロジェクト概要
資料 2-2　コンポスト化技術
資料 2-3　設備説明書
資料 2-4　図面集

PILOT SURVEY FOR DISSEMINATING SMALL AND MEDIUM ENTERPRISES TECHNOLOGIES FOR RECYCLING PROJECT OF ORGANIC GARBAGE AND AGRICULTURAL WASTE BY SCREW TYPE COMPOSTING PLANT

KAWASHIMA CO., LTD.

Survey Purpose

- Screw type composting plant will be introduced in a rural area of Sri Lanka in order to produce good quality organic fertilizer and create value chain of organic fertilizer distribution under the BOP business scheme, using organic domestic garbage through separate collection as a major raw material of composting.
- Agricultural waste can be utilized as a material for water content adjustment and livestock excreta can be also utilized as a raw material.
- It is also planned to establish a typical recycle model of organic waste.
- By contributing to reduce local government's expense for garbage disposal, to expand of job opportunity and to increase BOP people's income, the BOP business scheme would bring sustainable garbage collection and treatment.
- Furthermore, the scheme will reduce large amount of garbage at dumping site and prolong the life of the site as well as improve water environment issues and human health issues. It also contributes to reduce methane emissions from garbage disposal site and to improve climate change issues.

Summary of the Proposed Project

As the pretreatment of composting of organic waste, such refuses as dry cell are cleared away from belt lines installed for manual sorting in the composting plant. After removal of contained fragments of plastic and vinyl products, PET bottle, etc. with sieve, interim product taken out of the composting plant is further matured in storehouse. The products are sold as organic fertilizer for use of agriculture.

Treatment rate of the composting plant is 17t/d and a rate of compost producing is 6t/d with 1 unit of the automatic stirring system “RA-X”. Four buildings with the area of 560m^2 (W14m×L40m) will be constructed.

- ✓ composting plant (1 block): treatment volume 17t/d×1 units of ”RA-X”
- ✓ annual operation days time: 300 days (Sundays and holidays excluded)
- ✓ quantity of domestic wastes to be charged & quantity of absorbent (rice husks) to be charged: 5,100t/y

Screw Type Composting Plant

The automatic stirring system “RA-X” and the microbes “BX-1” are original technologies of Kawashima Co., Ltd. and patents are granted for “RA-X”.

It is known that continuous performance of aerobic high temperature fermentation is most effective in digestion of organic waste and control of smell (methane gas) generation during fermentation. However practically, it is very difficult and needs specially trained technique to ferment a large quantity of organic waste with unstable components under aerobic high temperature condition and sustain the fermentation. In this project, easily and continuously manageable compost technologies are to be introduced: a screw type automatic stirring system ”RA-X” and original microbes “BX-1”.

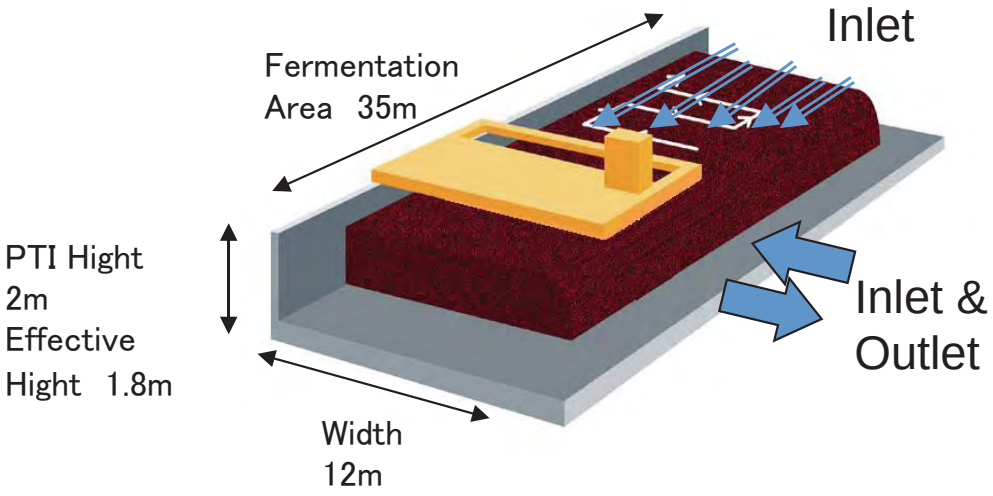
Screw type automatic stirring system ”RA-X”

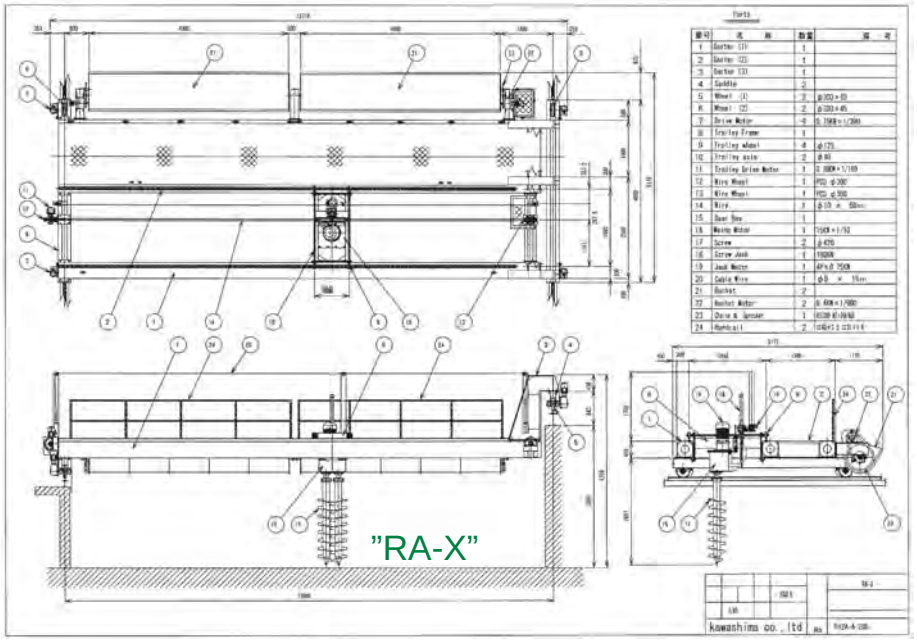
Simultaneous Treatment of Solids and Sewage by RA-X


特許証
特許第5442325号
株式会社カワシマ
川嶋 賢二
羽藤秀雄

Basic Specification

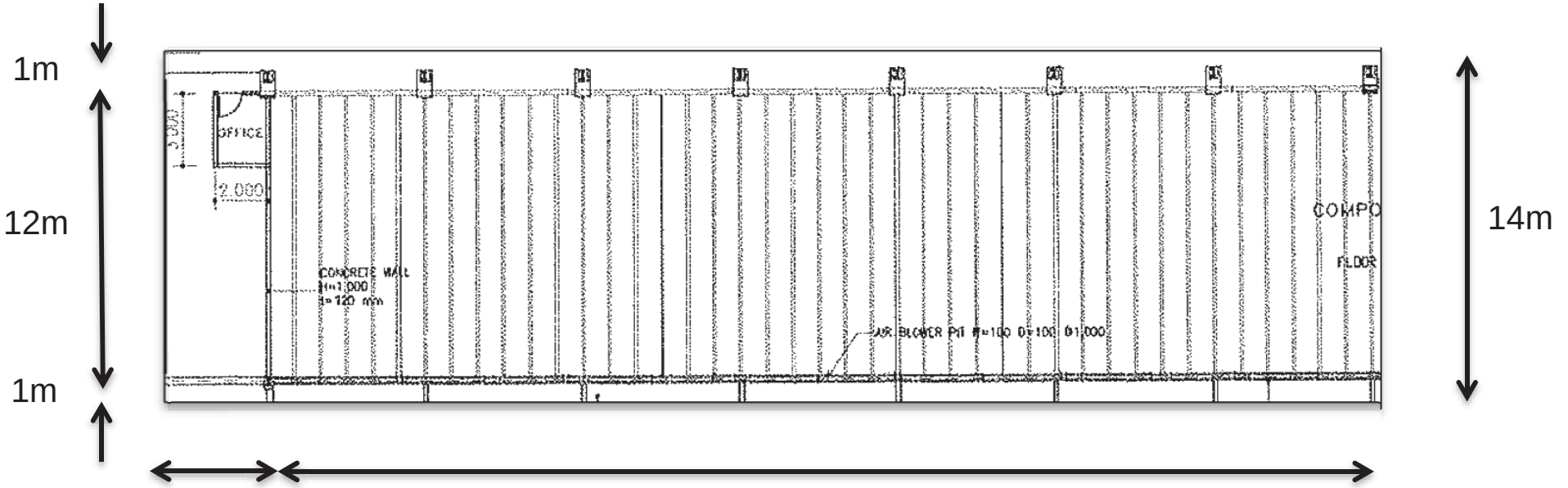
The same equipment is to be introduced for composting domestic wastes, but a maturing period in a fermentation tank and a treatment volume are different because of the moisture content of feedstock.
Core facility is one unit of the automatic stirring system “RA-X” and one unit of fermentation tank (hereinafter, “core facility”) to be installed along side wall (L-shape), which is optimum for mass treatment in a short period. In this L-type arrangement, one rail is laid on the concrete wall and the other rail is laid at the tops of a row of supporting pillars so spaced as to permit charging and discharging feedstock with a shovel loader. The automatic stirring system “RA-X” moves on the rails.





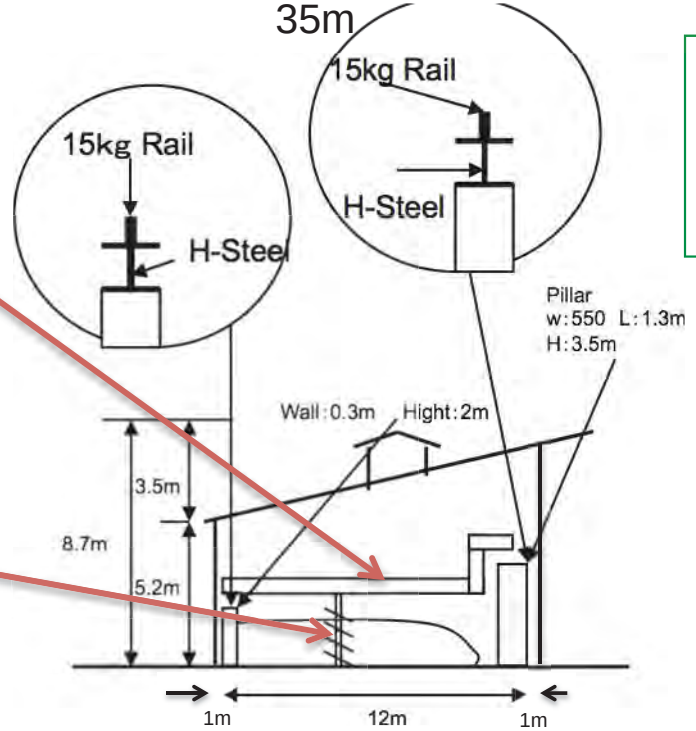
Screw type Automatic Stirring System

RA-X Building　　”RA-X”, and 1 unit of fermentation tank
W14m × L40m＝560m²



Sewage Spreading Buckets

”RA-X”



Core plant: Building (one block) ,1 unit of ”RA-X”, and 1 unit of fermentation tank
W14m × L40m＝560m²

Technical characteristic

- With an increased heap height in the fermentation tank that is hardly accomplished by scoop or rotary type, the automatic stirring system “RA-X” is capable of treating larger quantity of feedstock by one machine.
- And the structure is very simple with screws for stirring and operation motors, so the maintenance is very easy.
- Consequently, plant construction and maintenance costs of this system are less than 1/10 of those of other proposals, referring to introduction cases in Japan.
- Stable massive treatment with low costs will be feasible. In addition, sustainable treatment will be possible with very few mechanical troubles.
- Automatic stirring system “RA-X” diffuses little smell on stirring. Ammonia generated on aerobic fermentation may be less than 1/10 of that on anaerobic fermentation.

- RA-X Rated Power Consumption （per 1 unit）

Machine Category	Rated Consumption Power	Unit #	Installed Capacity	Load Factor	Operating Hours	Annual Operating Days	Annual Power Consumption
	(kw)		(kw)	(LF)	(h/day)	(days)	(kwh)
RA-X	21.05 kW	1	21.05 kW	0.85	8	300	42,942 kWh
Fermenter Blower	2.20 kW	3	6.60 kW	0.85	24	365	49,144 kWh
Total							92,086 kWh

Composting System

- Organic waste and moisture absorbent is brought into the fermentation tank by spreading buckets, and at the same time effective microbes “BX-1” are manually spread.
- Being stirred by “RA-X”, organic waste is aerobically fermented in the fermentation tank to convert to compost.
- During this process, water contained is removed by evaporation caused by elevated temperature of feedstock.

RA-X” Automatic Stirring System, Showing Appearance of Stirring Shift Movement along Crank Path

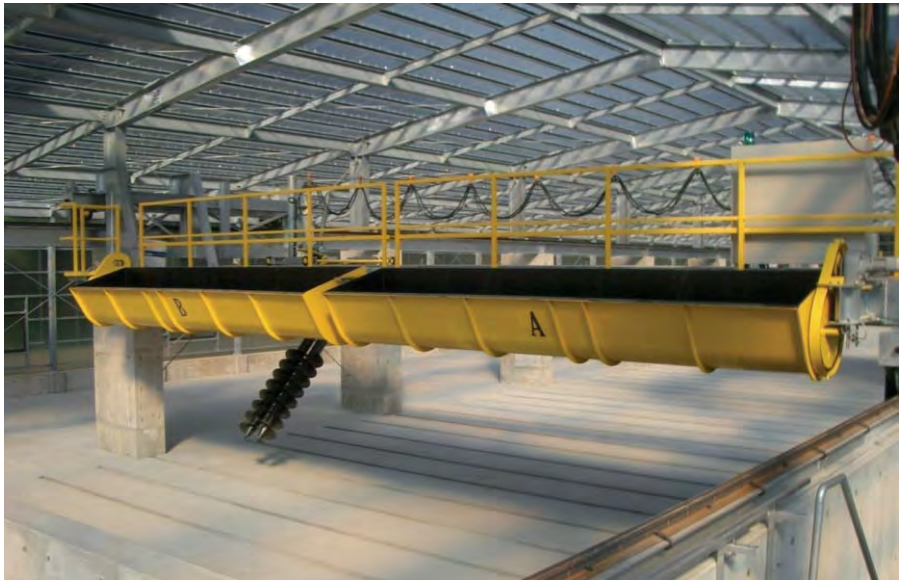
① Putting organic waste on buckets

② Carrying to Fermentation Site

③ Spreading Organic Waste

④ Spreading Organic Waste

Bucket Handling



Composting treatment routine

株式会社カワシマ
〒374-0004
群馬県館林市楠町3765
TEL:0276-72-6961　FAX:0276-72-6962
H.P　http://www.kawashima.jp

The purpose of composting

Legal observance

By a livestock excretion thing method, I forbid piling up out in the open and reclamation, and perform proper management.
Enforcement (November 1, Heisei 16 application) on November 1, Heisei 11 500,000 yen or less fine
Industrial-waste method: Illegal disposal Five years or less of penal servitude, 10 million yen or less, and a corporation are 100 million yen or less fines.
Green house effect gas emission-calculation and report / official announcement system (law) application in the Heisei 22 fiscal year 200,000 yen or less fine

A facilitation of utilization

Offer of the easy-to-use barnyard manure whose needs of the field husbandry farmhouse many hog raisers without cultivated land suited is a necessity.
Raw excrement has a strong odour, it is watery, a pathogenic fungi, a parasite, and a spore may be contained, and there is resistance.
By composting, I solve the above-mentioned issue, supply an organic fertilizer, and can build the recycling society of an organic resource.
* The secondary unfermented barnyard manure may ferment, when it returns to soil, and it is based on root corrosion and a genesis of gas.
We are anxious about issues, such as a genesis of a kink and a pathogenic fungi.

A facilitation of hygiene supervision

The stink which occurs in an anaerobic condition controls and I make a genesis retardation of a fly into a possible by carrying out proper management.
I urge to not only the inside of a hoggery location but also solution of the stink issue to a neighborhood.

Composting

In composting, a microbial is the leading role.

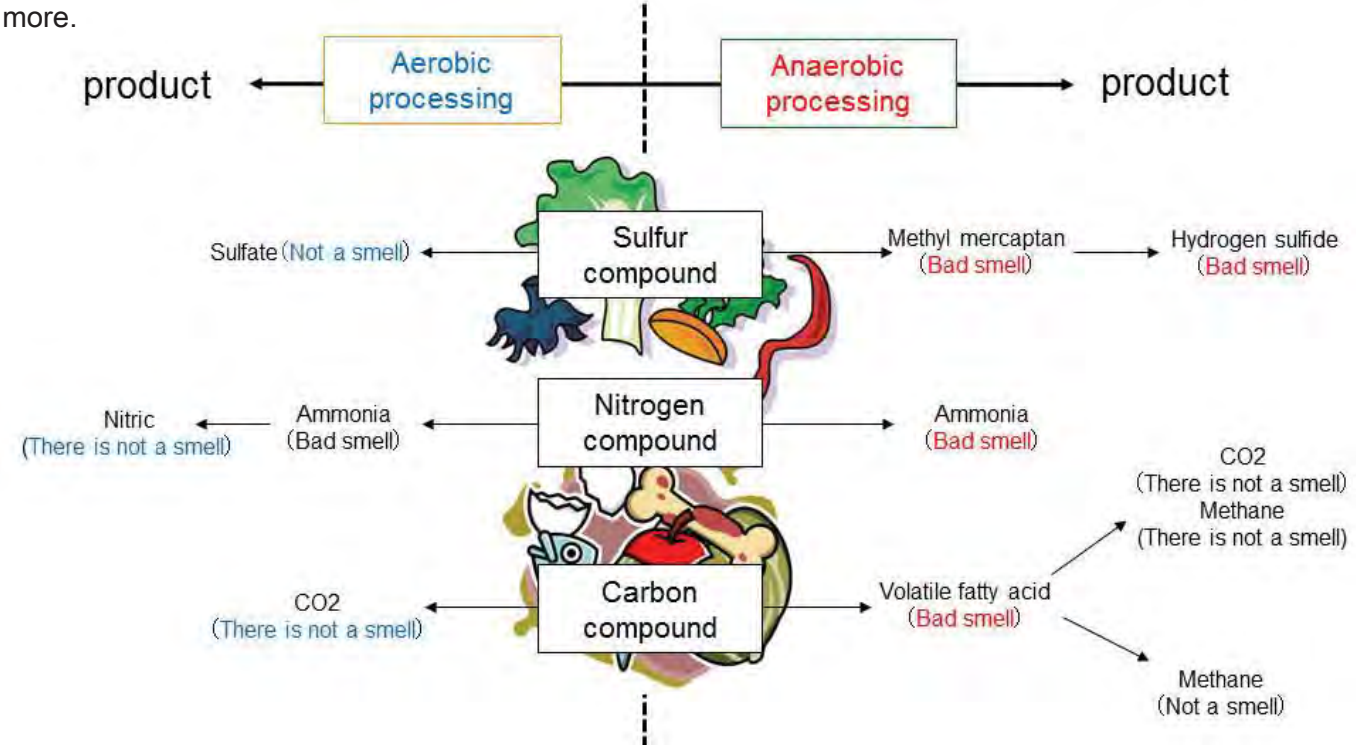
The nutrient contained in excrement is divided into the degradable organic matter which becomes a basis of a stink and a pathogenic fungi with an energy-rich, and a difficulty resolvability organic matter with little energy, such as a fiber, and processing especially a degradable organic matter by a microbial efficiently.

The big purpose

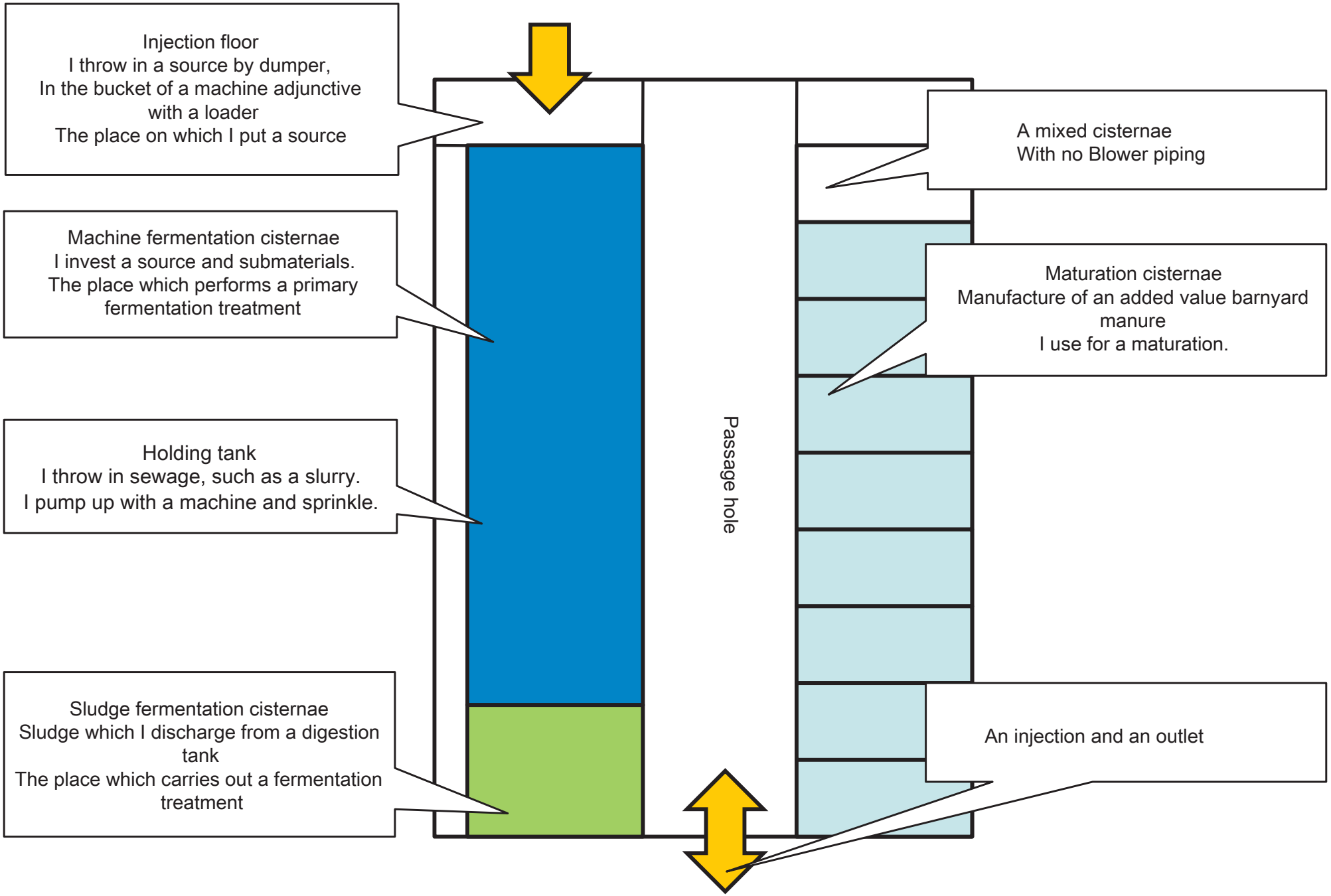
I decompose into a carbon disulphide and an aqueous the nutrient where an aerobic bacteria carries out an activity and which has it in excrement, and I can decrease, can control a genesis of a stink, and can shorten a digestive (maturation) period.

The microbial activity basal condition of composting

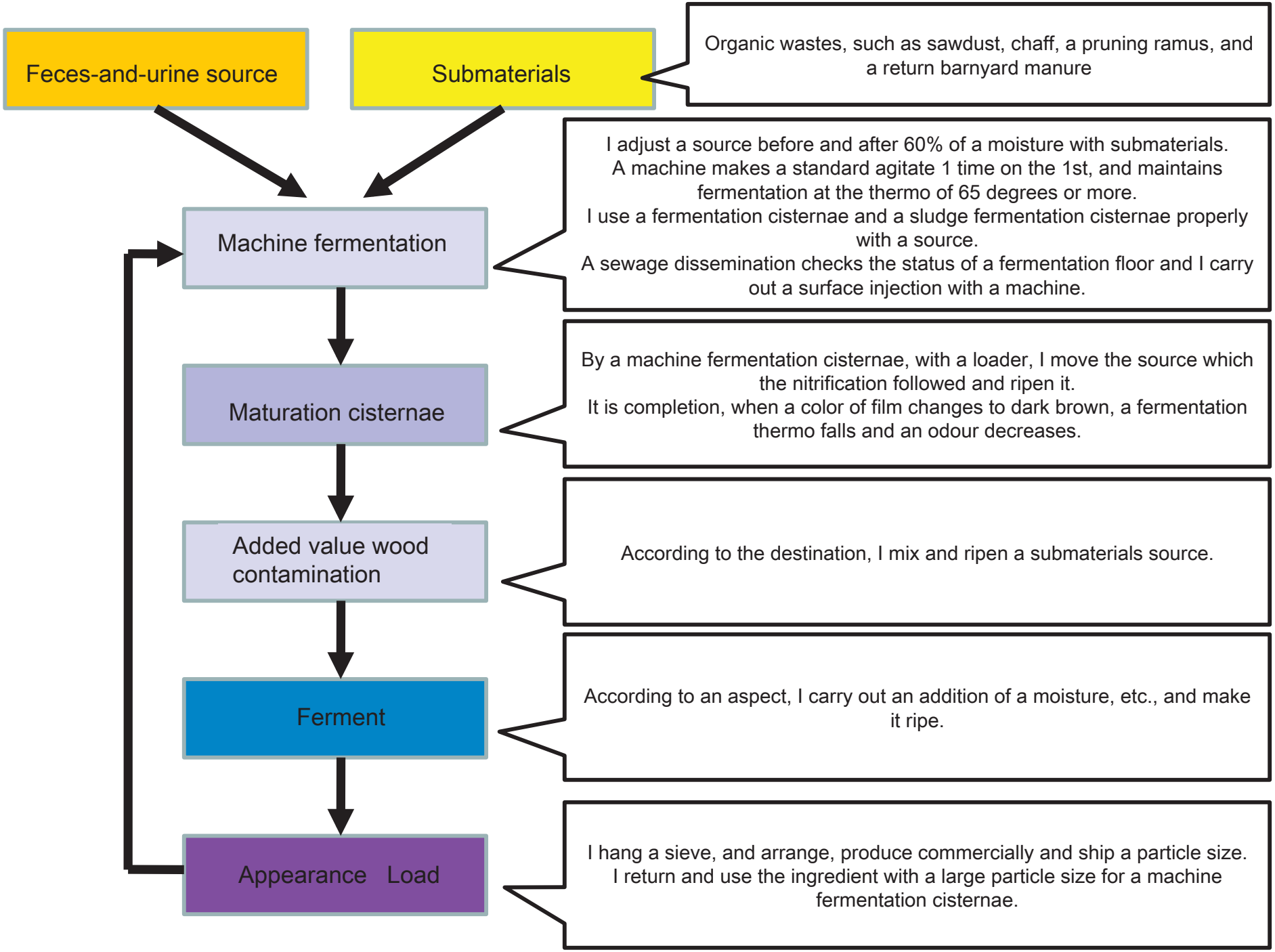
1. Nutrient : It is mostly contained in a degradable organic matter, and the calorie of excrement is 4,000-5,000 kcal.
   It is an important to perform aerobic fermentation quickly so that it may not be in an anaerobic fermentation status.
2. Moisture : I am raw excrement and it is just over or below 80%. Aerobic fermentation conditions are just over or below 60%.
3. Aero : 30% of substance voids are best conditions (300 liters/(minute) from per [? / 50]).
4. Microbial : 10 million-100 million pieces exist in the raw excrement 1g.
5. Thermo : The best fermentation thermo is about 80 degrees from 70 degrees.
   A microbial becomes an activity, then an elevated temperature.
6. Period : More than whole period 60 day recommends.
   The source with much fiber is 90 days or more.



Whole top view



Processing flow fig



Advance preparations

1. I invest submaterials in a machine fermentation cisternae.

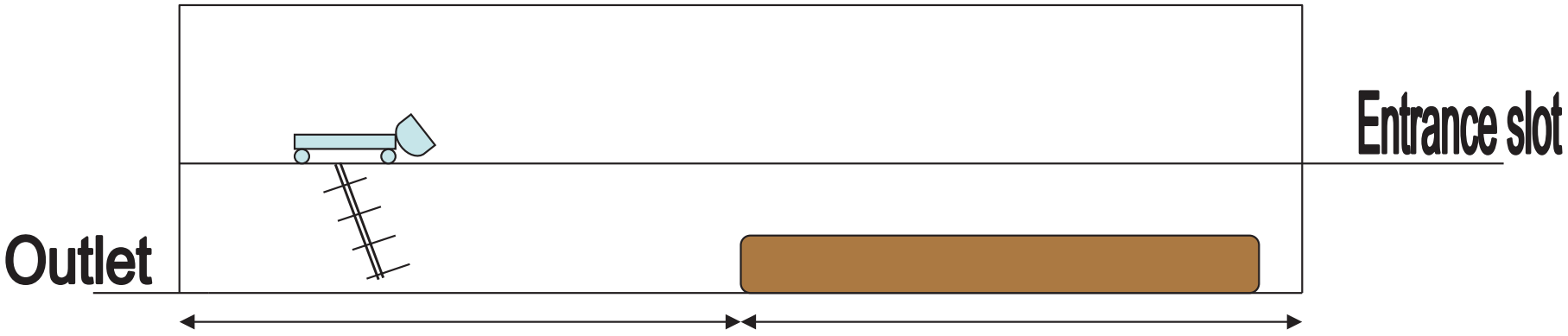
O Amount of injections One half of overall lengths About 2/5 depth

O Source modality of submaterials Organic matters, such as a Burk wood and sawdust Little way of a moisture is the optimal.

2. Sprinkle a fermentation facilitation wood.

O I sprinkle on a submaterials front face.

* When an aqueous, a source, etc. are mixed in a blower, please remove beforehand.



Injection routine

1. I put a source on a bucket and sprinkle on the submaterials which I already invest using a controller.

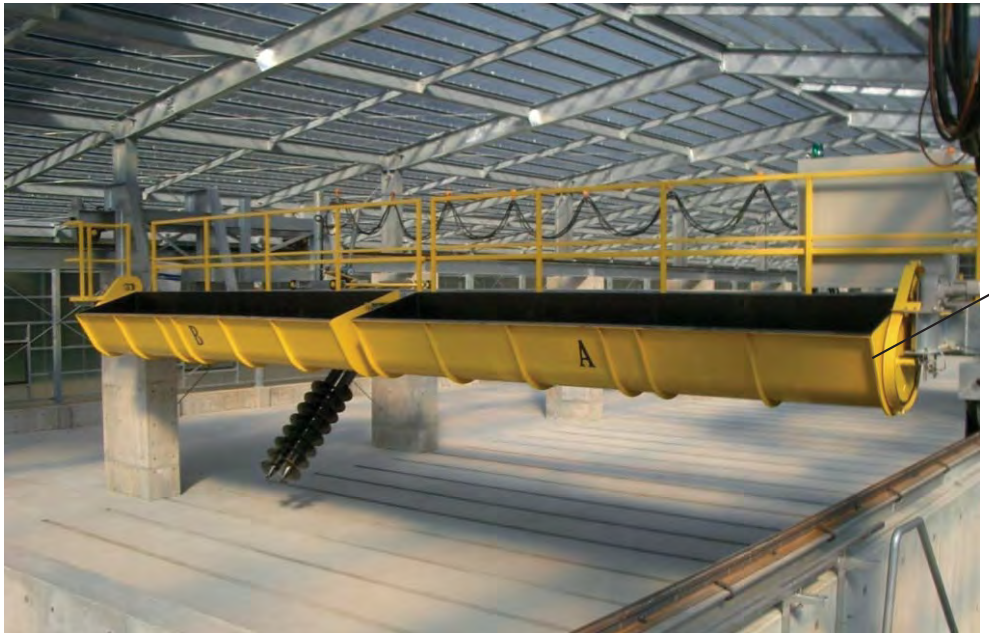
O The notes in a dissemination
I do not collect and sprinkle to one place, but make it sprinkle thinly.
I check a front face, invest submaterials in a watery place with a bucket, and perform moisture management.

2. Agitate 1 time per day to a standard.

O When the amount of sending is insufficient, I compensate with increasing the number of times. However, when a fermentation thermo falls, they are decreases about the number of times of churning. I carry out.
O A source dissemination makes about draw-off this side 10m refrain from it and carry out the fermentation maturation of the dissemination.

3. Timing of dissemination and churning

O When sprinkling an excrement source to the fermentation floor to which the fermentation thermo was maintained, I do not agitate immediately after a dissemination but the amount of excrement Nakamizu transpires with an ON.
I agitate, after placing like for one day.
O I supply so that it may not become in a dissemination more than a fermentation cisternae (2 m in height).



Bucket

Controller

Fermentation management

1. Corrective strategy when fermentation thermo falls　I manage a fermentation thermo or more to 65.

O When a fermentation thermo is low (60 degrees or less), I invest submaterials and perform moisture management.
O it is churning when agitating to the frequent -- cutting down .
O I use a fermentation facilitation wood.

2. Valid dissemination area

O About (from the draw-off side to about 10m) 1/5 fermentation cisternae does not sprinkle, but is taken as a maturation period.

3. Standard of maturation

O When a nutrient required for fermentation fell and digests, a fermentation thermo falls.
O If the source which the nitrification followed is agitated, I will become easy to adhere to the feather of a screw.

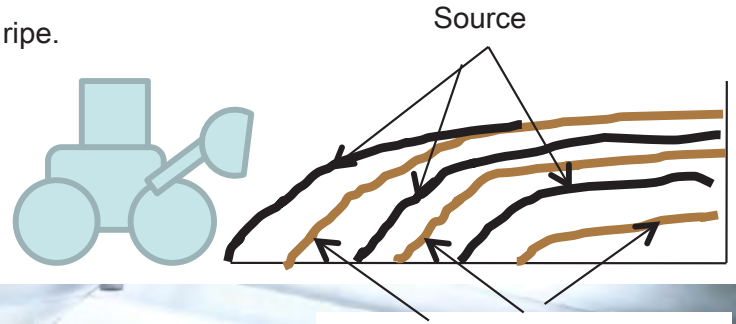
*　Fundamental fermentation management
When performing an efficient nitrification, aerobic elevated-temperature fermentation is suitable.
Since an aerobic elevated-temperature fermentation status also has little genesis of a stink and is quick, I am most suitable for composting of feces and urine. [of the digestive speed of an organic matter]
By processing at an elevated temperature, in order to also give the difficult fiber texture of a resolution a damage, I make the resolution by a next anaerobic into an easy.
As for the habitat for performing aerobic elevated-temperature fermentation, 30% of a substance void serves as a standard.
I am useless, even if there is too much quantity of an aero and it is too small. 30% of this void is about 60% of a moisture content about.
Not agitating is a principle when fermentation is performed at the elevated temperature.

Direct injection

1. When supplying from the side of fermentation cisternae
I accumulate a source and a moisture adjustment wood (wood waste, return barnyard manure) in the shape of sandwiches, and make them deposit. (I deposit on 2 m or less.)
I supply so that the whole moisture may be about 60% at the time of an accumulation.
Point: When a height falls so that a source may flow out after an accumulation, it is excess of a moisture.

I agitate after an accumulation by a RA-X machine.

2. If a fermentation treatment is finished, I will move to secondary fermentation cisternaes and will ripe.



RA-X fermentation cisternae

Sewage dissemination

I sprinkle pumping up sewage from the holding tank installed in the fermentation cisternae upper part covered with the source and the moisture adjustment wood at the side wall.
A dissemination is controlled by a computer and will sprinkle 1 time to a standard on the 1st. (An application amount is a setting possible to an arbitrary)
A source becomes black, the amount of moistures of the standard of the fermentation cisternae (floor) which the maturation followed increases, or it becomes easy to attach a source to the knife-edge of a screw.

Maturation

If a barnyard manure ferments and a maturation progresses, the odour of a source will decrease.
As for the source which changed to dark brown, a yeast and an Actinomyces breed on a surface layer.

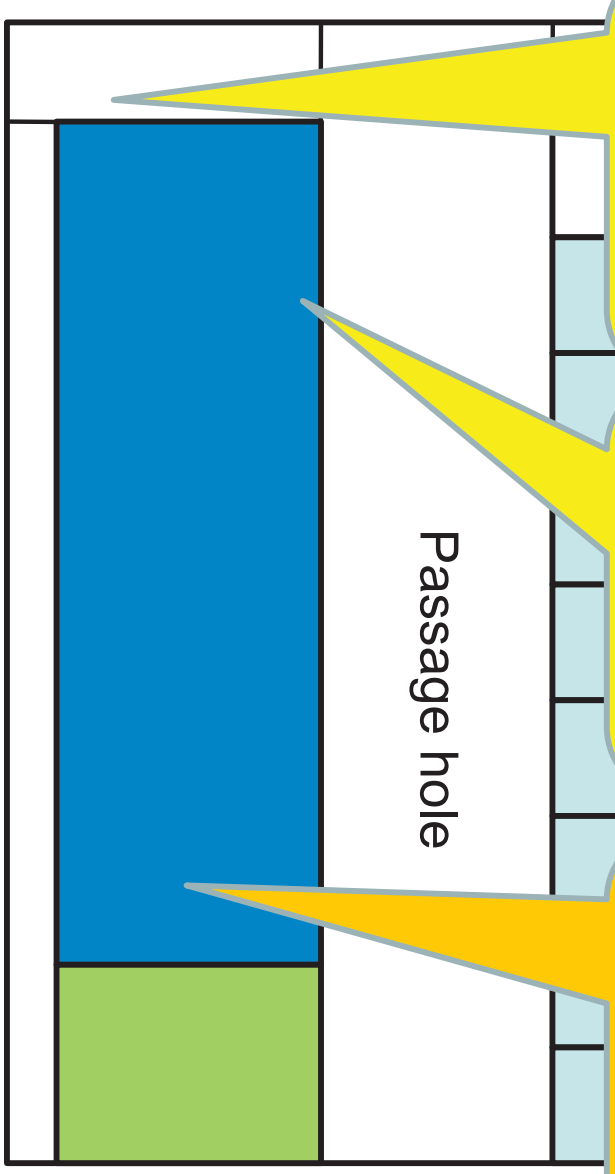
I add and produce a manure source commercially if needed.

I can check the bacillus which will breed if a front face is removed.

Odour management

The measure by a gas detector

The stink which will occur if aerobic fermentation is performed efficiently serves as only an ammoniacal odour, and its genesis of an odour also decreases very much.
Since a fermentation thermo is also stabilized at an elevated temperature, a nitrification and a maturation period are shortened.
I perform thermo management and odour management so that fermentation may continue at an elevated temperature, and when there is an issue, I perform early measures (moisture adjustment etc.).



I measure with a gas detector.
I measure in the barnyard-manure upper part in fermentation.

Ammonia concentration	Fermentation thermo
10ppm	79 ℃

I measure with a gas detector.
I measure in the barnyard-manure upper part in fermentation.

Ammonia concentration	Fermentation thermo
10ppm	79 ℃

The measure by a gas detector
A measure of the genesis odour at the time of churning

Ammonia concentration	Fermentation thermo
60ppm	79 ℃

2010.10. The room temperature is 25 ℃.

Deodorizing retardation filling material

Bio-laboratory-chow BX-1 improves an intestinal environment by adding in a laboratory chow, and it is improvement in a digestive efficiency,
I can expect improvement in a zootic immunity strength, etc., I unite, and an odour falloff of a living matter and an odour falloff of feces and urine. I am expectable.
Moreover, they are the facilitation of fermentation of a barnyard manure, and a genesis retardation of an odour by adding in fixed quantity to the excrement discharged. I am very effective.
There is a track record in much fields, I begin a Japanese, and it is a high ware of a valuation overseas.

<u>**Directions for use are BX-1 to the barnyard manure five m3. 1kg addition is a standard.**</u>

1995年(平成7年) 10月18日 水曜日 朝日新聞

家畜のふんのにおい消せ

えさに混ぜて使う添加物が好評

「だれが使っても同じ効果得た」

悪臭公害の一つとなっている家畜のふんのにおいを消そうと、ここ数年、えさに混ぜて使う発酵菌の添加剤の商品開発が盛んだ。注目を集めたEM（有用微生物群）や、全国農業協同組合連合会が昨年発売した「201」（ニオワン）」などの製品に交じり、栃木県佐野市村上町に工場を持つ株式会社「カワシマ」（川嶋賢二社長、本社・館林市）が売り出した微生物資材「BX－1」が話題を呼んでいる。

館林の「カワシマ」が販売

会長の川嶋和男さんと社長の賢二さん父子が、十年ほど前から全国各地の肥よくな土を収集。その中から脱臭効果のある土壌菌を選び出し、三年ほど前に開発した。下水処理施設の汚泥や畜産農家のふん尿などを、無臭たい肥化する添加物として売り出した。

昨年四月から試験的に導入している茨城県美野里町の養豚業、島田敏之さん(55)によると、「ふん独特のにおいがほとんどなくなり、畜舎内のハエが数えるほどになった」という。

島田さん方では、飼育頭数を約五百頭から千頭に拡大するのに伴って倍増するふん尿の処理をどうするかが最大の悩みだったが、「BX－1」の導入で、ふんのたい肥化も早まった。一カ月当たりのコストは三千円程度で済んだ。

この効果に目をつけ、JA茨城県経済連傘下の「茨城くみあい畜産」が今年六月ごろから、組合員の養豚農家約二十五軒に導入した。くみあい畜産の獣医師を務める原田栄次業務副部長は「最近は多くの添加物が出ているが、だれが使っても同じ効果が得られたのがBX－1だった」という。

「カワシマ」の依頼で、三年前から成分分析や動物実験などの研究を続けている山口大学農学部の牧田登之学部長によると、BX－1は数種類の乳酸菌と酵母菌が含まれる複合菌の一種で、「どの菌がどう作用するかは解明されていないが、ふん独特の臭みが甘酸っぱいにおいに変わる効果がある」という。

昨年、「201」を開発した全農飼料畜産中央研究所（茨城県つくば市）によると、現在、市場には二十種類を超す消臭用添加剤が出回っているが、普及し始めたのはここ数年という。

ただし、「201も含め、一〇〇%においを消すものもなければ、全く効かないものもない。どの発酵菌が何にどう有効かなどは、ほとんど未解明なのが現状」という。

牧田学部長も「穀物がおいしい、おいしくないみたいなもので、かなり古くから経験的に利用されていた民間利用を、現在、科学的に解明している段階」と、現在、研究途上の分野であると説明する。

カワシマでは今後、サトウキビのかすなどを発酵処理し、家畜のえさに変える研究なども始めたい、と意欲的だ。

ハエが目立たず、においもほとんどなくなった豚舎に立つ川嶋和男会長＝茨城県美野里町の農家で

資料2-3

RA-X operation manual

Each part nomenclature Whole

Thank you very much for purchasing composting-plant RA-X lately.
Since a daily maintenance serves as an important by the superior for which you ensure an everyday running and use it for a long period of time,
I perform a daily checking and please give me early management.

Run motor

Wheel

Bucket

Screw

Cable truckle

Cable garter

Motive-power cable

Run sensor

A distribution power board on a plane

Rail

Each part nomenclature

A screw, trolley unit

Transversal cable

Rise-and-fall gear

Frame

Rise-and-fall gear rubber cover

Gear box trolley frame connection bearing

Gear box

Aeration stiff pipe

Main motor

Trolley frame

Screw

Trolley surfacing prevention wheel

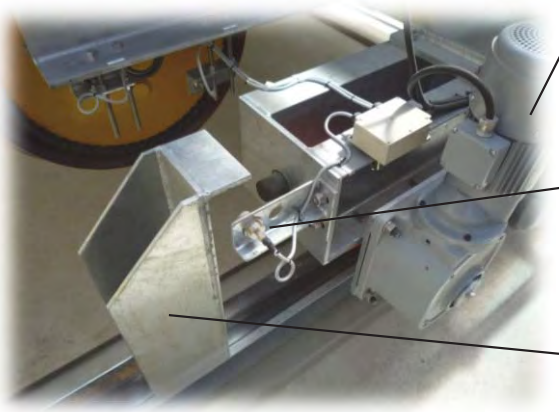
Screw cutter

Screw knife-edge

Transversal motor

Wire sheep

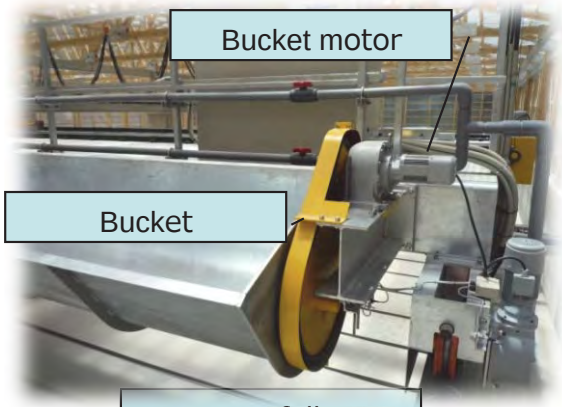
Each part nomenclature A gear, distribution power board, etc.



Run motor

The sensor for emergency shutdowns Overrun (for a progress)

Bumping post

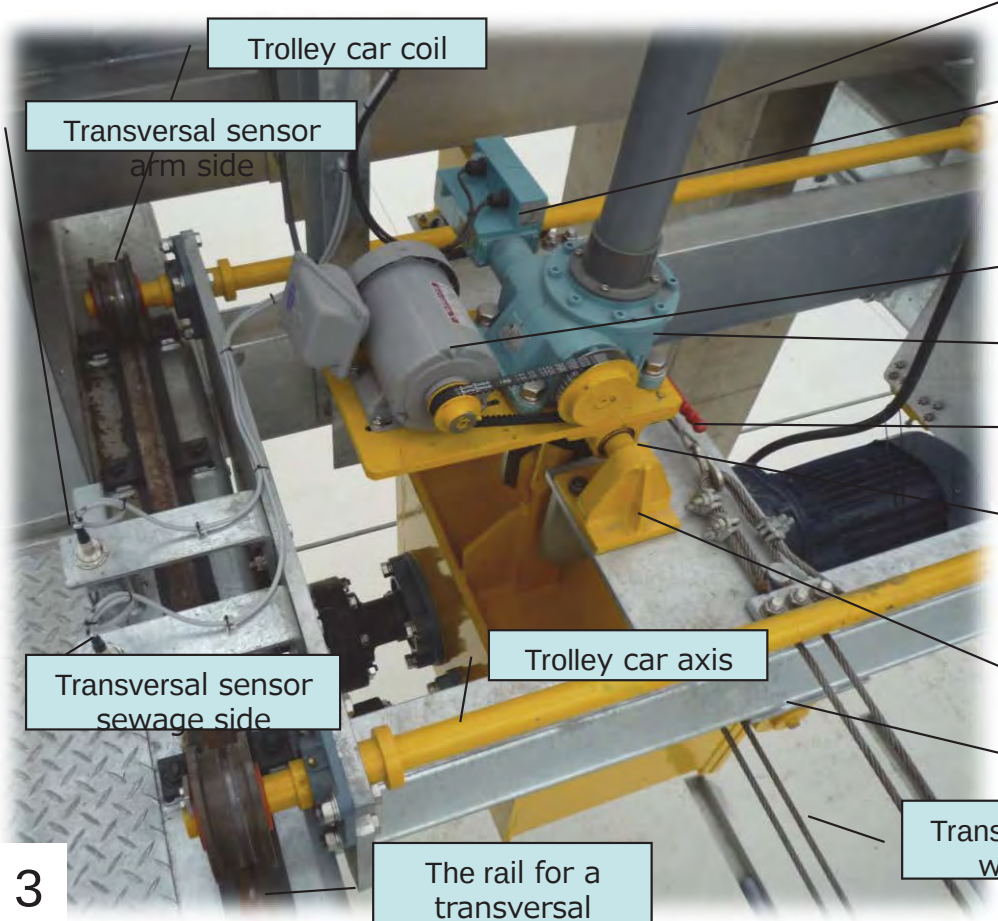


Bucket motor

Bucket

Remote-manipulation disk

A distribution power board on a plane



Trolley car coil

Transversal sensor arm side

Transversal sensor sewage side

Trolley car axis

The rail for a transversal

Rise-and-fall gear holder

Rise-and-fall gear angles adjustment switch

Rise-and-fall gear motor

Rise-and-fall gear

Transversal wire tightener

Rise-and-fall gear block Pyro bearing

Rise-and-fall gear block Sutee

Trolley frame

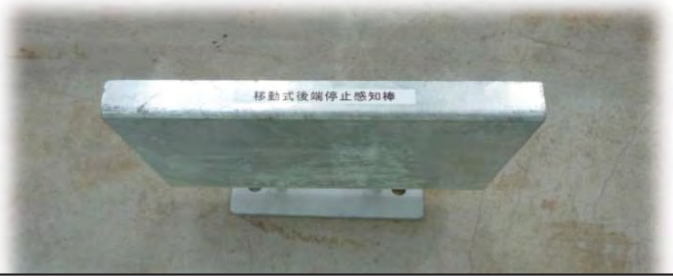
Transversal wire

Pendant switch

Each part nomenclature Run sensor

Progress shutdown perception rod

Back end shutdown perception rod



Portable back end shutdown perception rod
I use it, when setting a shutdown location as the place of an arbitrary.

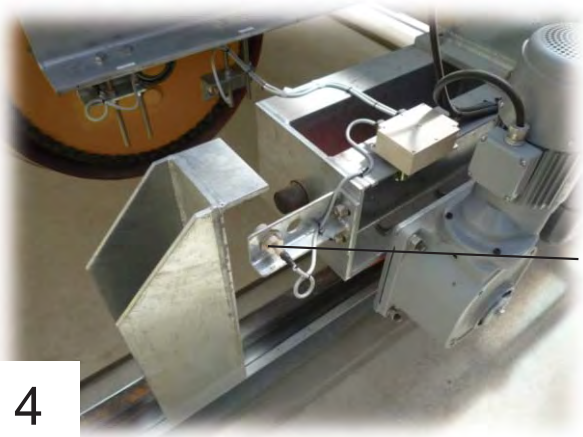
45- sensor

60-sensor

90-sensor

Back end validation sensor

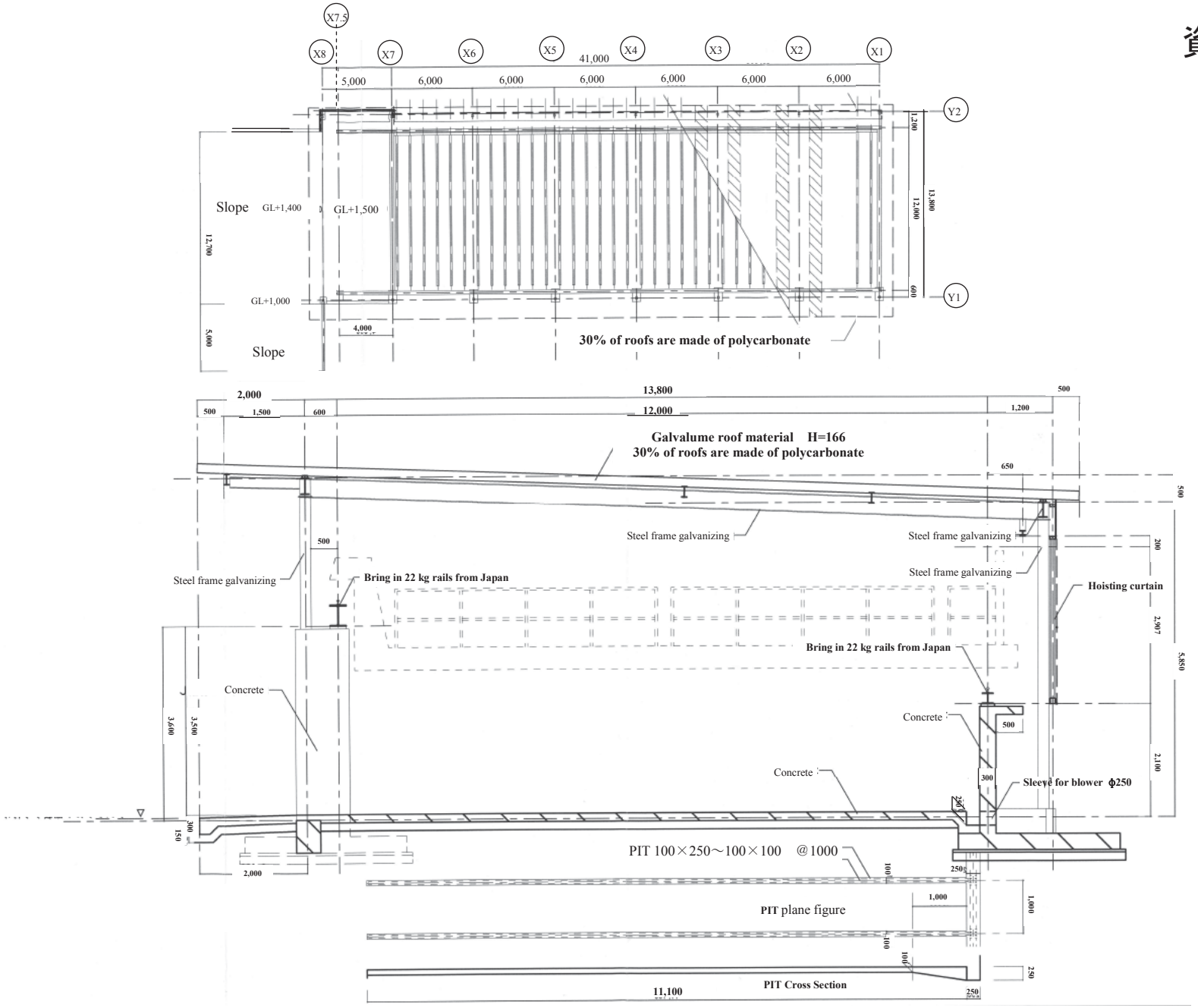
I set the gap of a sensor and a perception rod as 10 mm to less than 5 mm.
A lamp lights up green at the time of normal perception (detection).
(Green is proper although it is in a detection status also with a red lamp.))

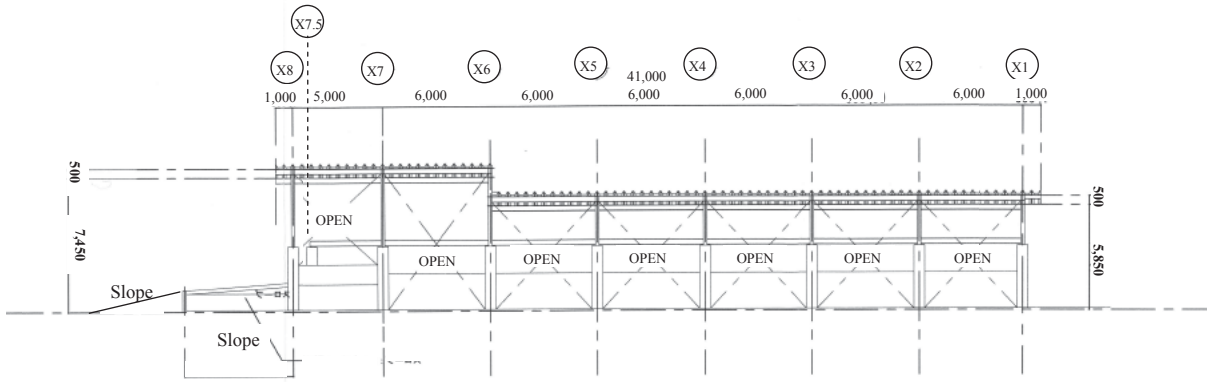


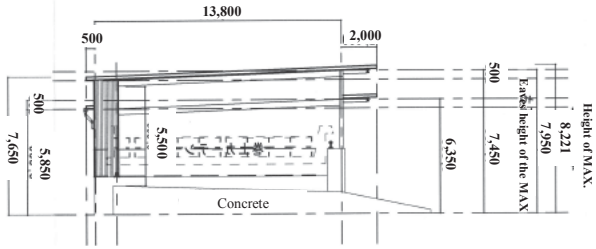
Before and an after emergency-shutdown sensor
The red lamp is on at the time of normal.
I will put out the light, if it perceives (detection).

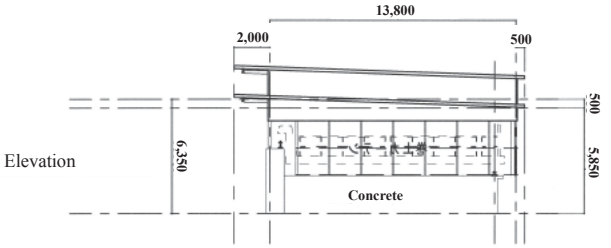
* There are three perception rods of the system.

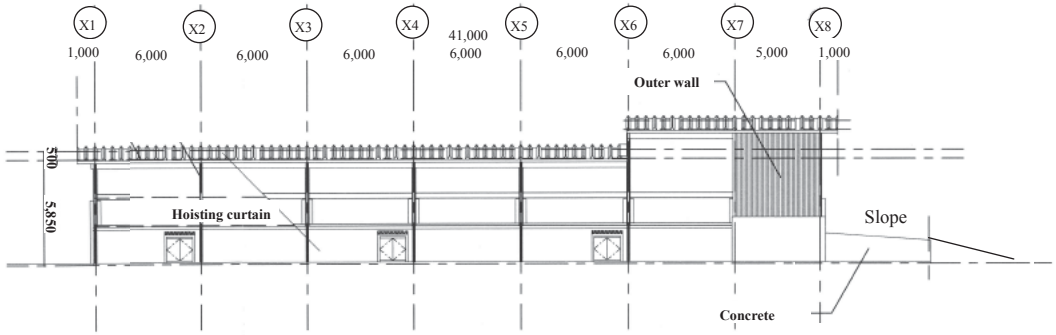
資料2-4


X7.5
X8
X7
X6
X5
X4
X3
X2
X1
41,000
5,000
6,000
6,000
6,000
6,000
6,000
6,000
Y2
Y1
Slope
GL+1,400
GL+1,500
GL+1,000
Slope
12,700
5,000
4,000
1,200
12,000
600
13,800
30% of roofs are made of polycarbonate
2,000
500
1,500
600
13,800
12,000
1,200
500
Galvalume roof material H=166
30% of roofs are made of polycarbonate
650
Steel frame galvanizing
Steel frame galvanizing
Steel frame galvanizing
Steel frame galvanizing
500
Bring in 22 kg rails from Japan
Hoisting curtain
200
2,907
5,850
Bring in 22 kg rails from Japan
Concrete
Concrete
500
Concrete
300
Sleeve for blower ϕ250
2,100
3,600
3,500
300
150
2,000
PIT 100×250～100×100 @1000
100
250
1,000
1,000
PIT plane figure
100
100
250
11,100
PIT Cross Section
250

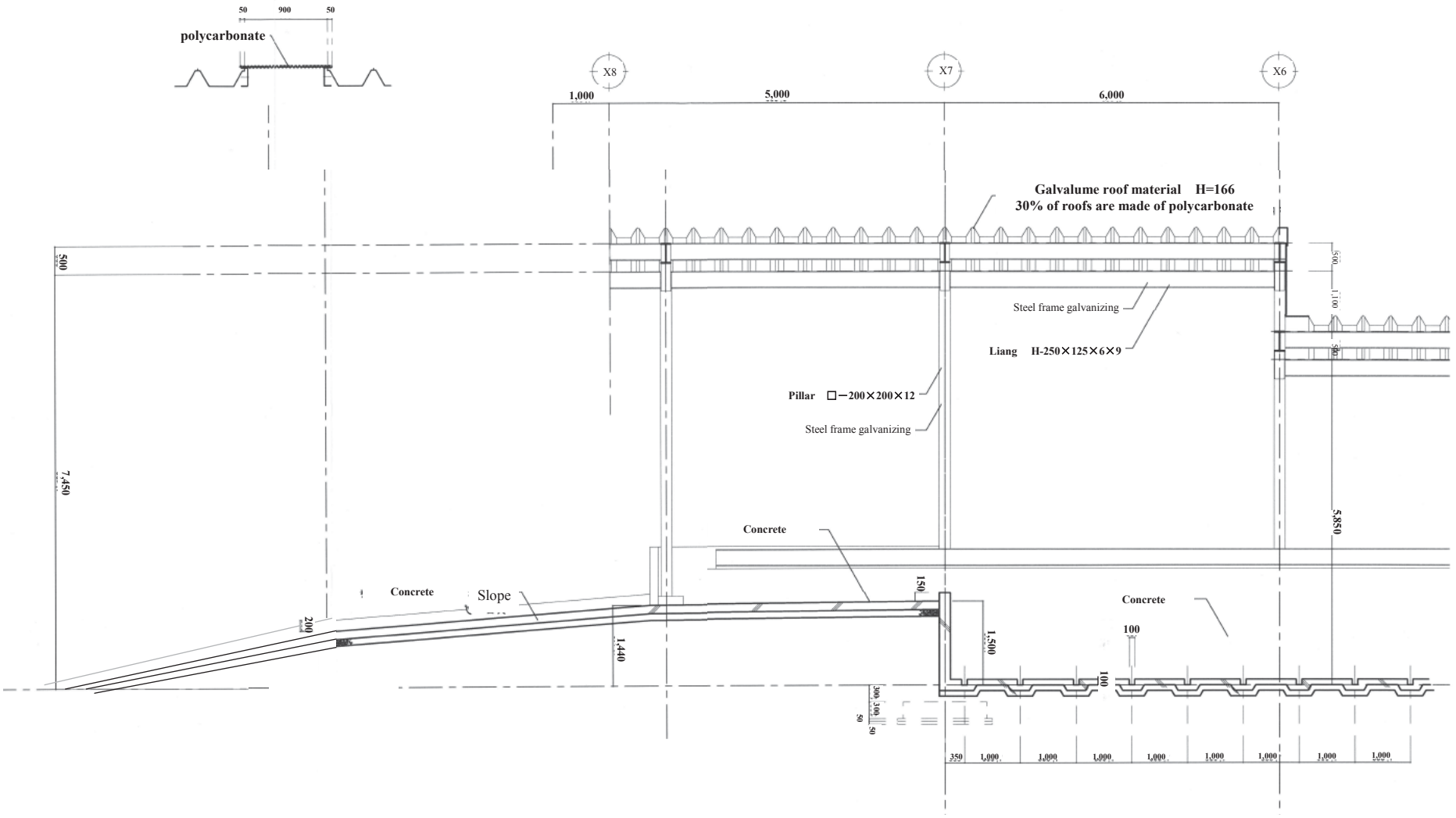

X7.5
X8
X7
X6
X5
X4
X3
X2
X1
1,000
5,000
6,000
6,000
41,000
6,000
6,000
6,000
6,000
1,000
500
7,450
OPEN
OPEN
OPEN
OPEN
OPEN
OPEN
OPEN
500
5,850
Slope
Slope

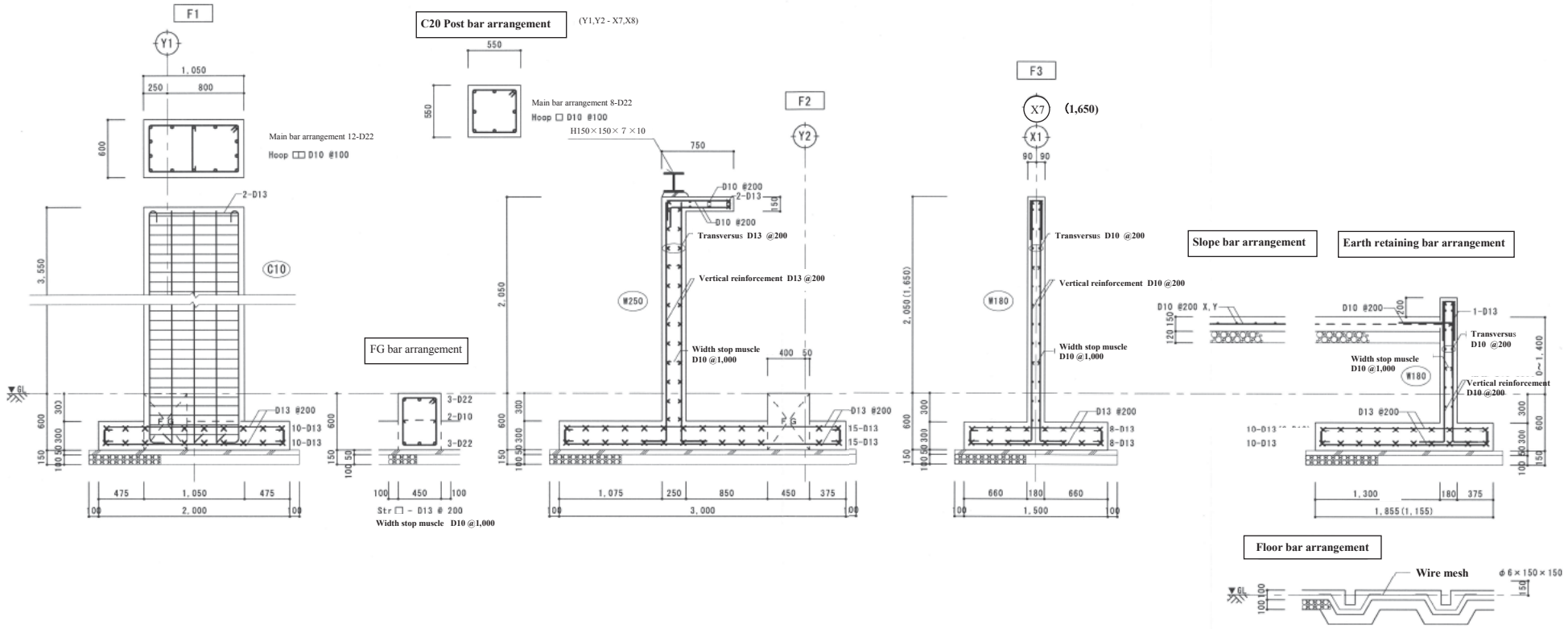

13,800
500
2,000
500
500
5,850
7,650
5,500
6,350
7,450
Earth's height of the MAX.
8,221
7,950
Height of MAX.
Concrete


13,800
2,000
500
Elevation
6,350
500
5,850
Concrete


X1
X2
X3
X4
X5
X6
X7
X8
1,000
6,000
6,000
6,000
41,000
6,000
6,000
6,000
5,000
1,000
Outer wall
500
5,850
Hoisting curtain
Slope
Concrete

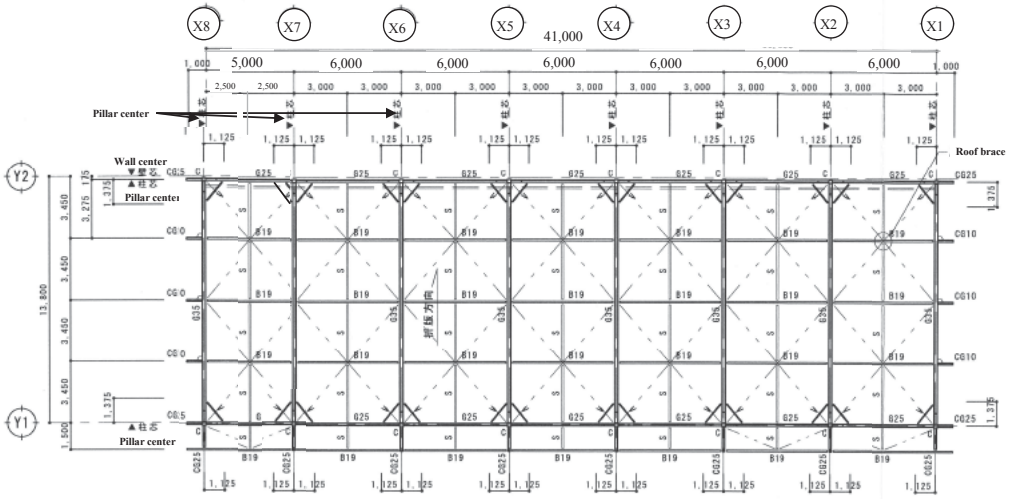
Elevation


50
900
50
polycarbonate
X8
X7
X6
1,000
5,000
6,000
Galvalume roof material H=166
30% of roofs are made of polycarbonate
Steel frame galvanizing
Liang H-250×125×6×9
Pillar □-200×200×12
Steel frame galvanizing
500
7,450
Concrete
Slope
Concrete
200
1,440
150
1,500
Concrete
100
100
5,850
500
1,100
580
300
300
50
50
350
1,000
1,000
1,000
1,000
1,000
1,000
1,000
1,000

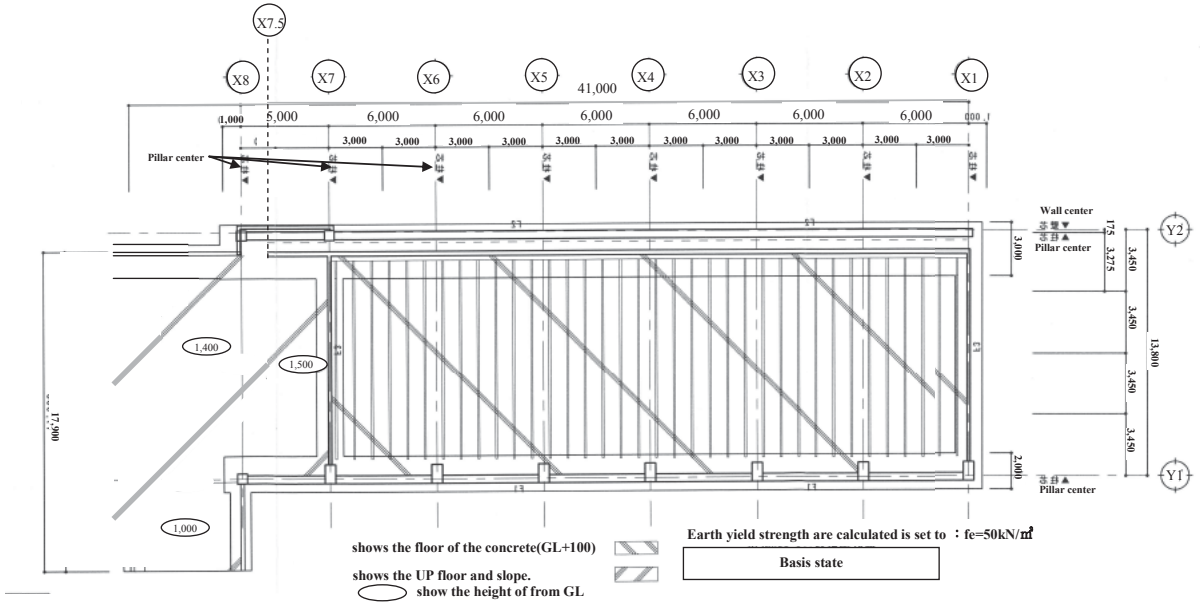


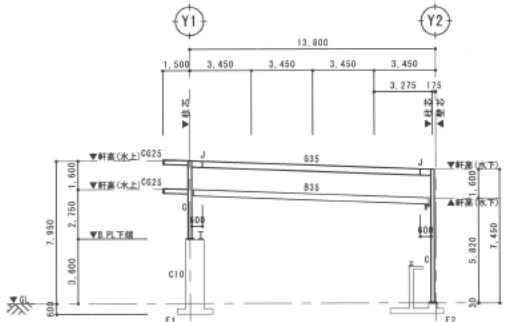
使用材料一覧表

・コンクリート Fc24N ・捨てコンクリート Fc18N セメント JIS R 5210(2009) 普通ポルトランドセメントの品質と同等以上とする。 砂 JIS A 5308(2009) レディミクストコンクリートの「付属書1」で定める砂に適合するものを用いる。 水 JIS A 5308(2009) レディミクストコンクリートの「付属書3」で定める水に適合するものを用いる。	混和材料 混和剤 JIS A 6204 AE剤, AE減水剤又は高性能AE減水剤の使用量は, 所定のスランプ及び空気量が得られるように定める。 普通ポルトランドセメントを用いたコンクリートで, 圧送が困難な場合には、フライアッシュ（JIS A 6201）I種又はII種を混合することができる。 ただし、この場合は、単位セメント量を減じない。	鉄筋 SD295A D10からD16 鉄筋 SD345 D19からD22 JIS G3112の規格品を標準とする。施工はJASS5（2009）による。

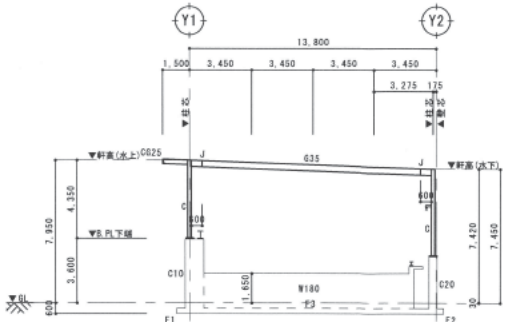


Roof beams state

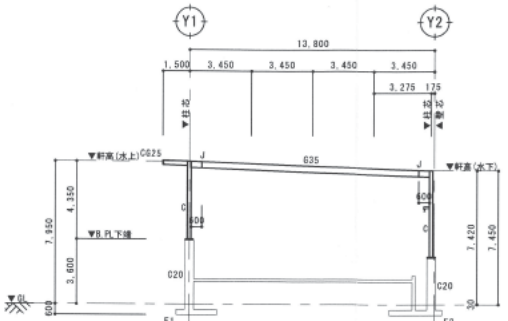




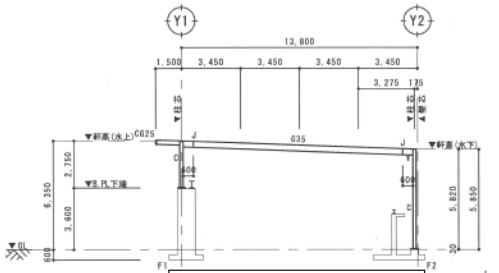
X6 line, assembled view



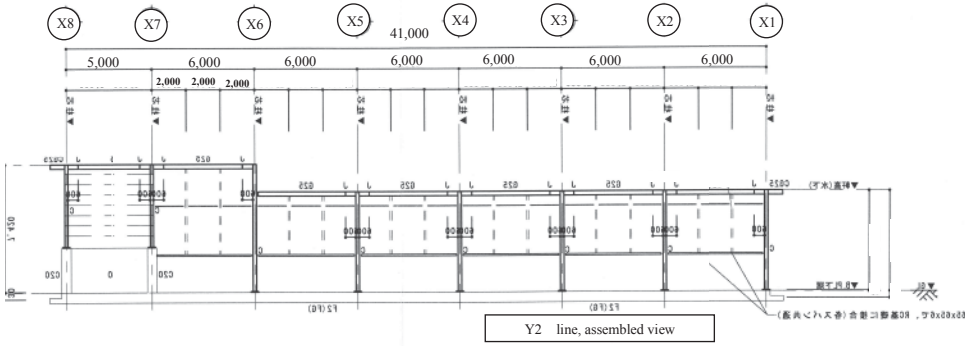
X7 line, assembled view



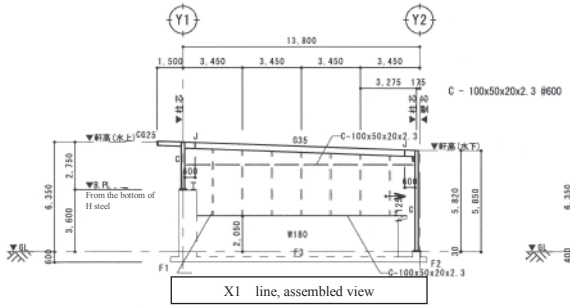
X8 line, assembled view



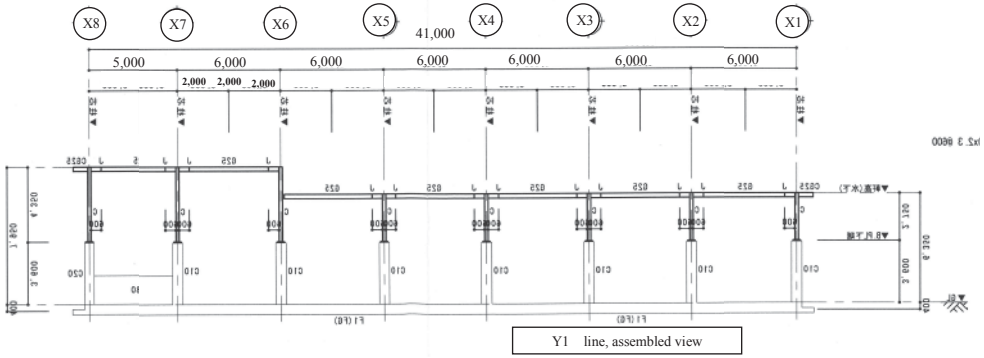
X1～X5 line, assembled view



Y2 line, assembled view



X1 line, assembled view



Y1 line, assembled view

5,000

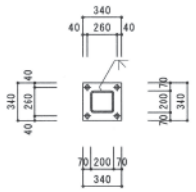
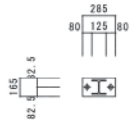
Parts List

※BCR295【認定番号MSTL-9021】
SS400 【JIS G 3101】 SSC 【JIS G 3350】
ダイアフラム：SN490C【JIS G 3136】

Sign	Member
C	□ - 200 x 200 x12
G35	H - 350 x 175 x 7 x 11
G25, CG25	H - 250 x 125 x 6 x 9
CG10	H - 100 x 100 x 6 x 8
B19	H - 198 x 99 x 4.5 x 7
V	[- 100 x 50 x 5 x 7.5
S	2Cs- 100 x 50 x 20 x 2.3
P	H - 125 x 125 x 6.5 x 9
Roof brace	M16 Buckle
Horizontal Doen	C - 100 x 50 x 20 x 2.3 @600 2Cs - 100 x 50 x 20 x 2.3 @1800

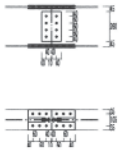
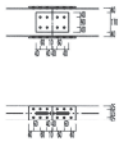
Column base

Anchor bolt : SS400
Baseplate : SS400

Sign	C
Member	□ - 200 x 200 x 12
Cross section	
Plate	B.PL-22(SN490C)
Bolt	A.B 4-M20 L=450 Double nut washer, hook included
Sign	P
Member	H - 125 x 125 x 6.5 x 9
Cross section	
Plate	B.PL-16
Bolt	A.B 2-M16 L=450 Double nut washer, hook included

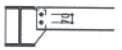
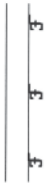
Girder joint list

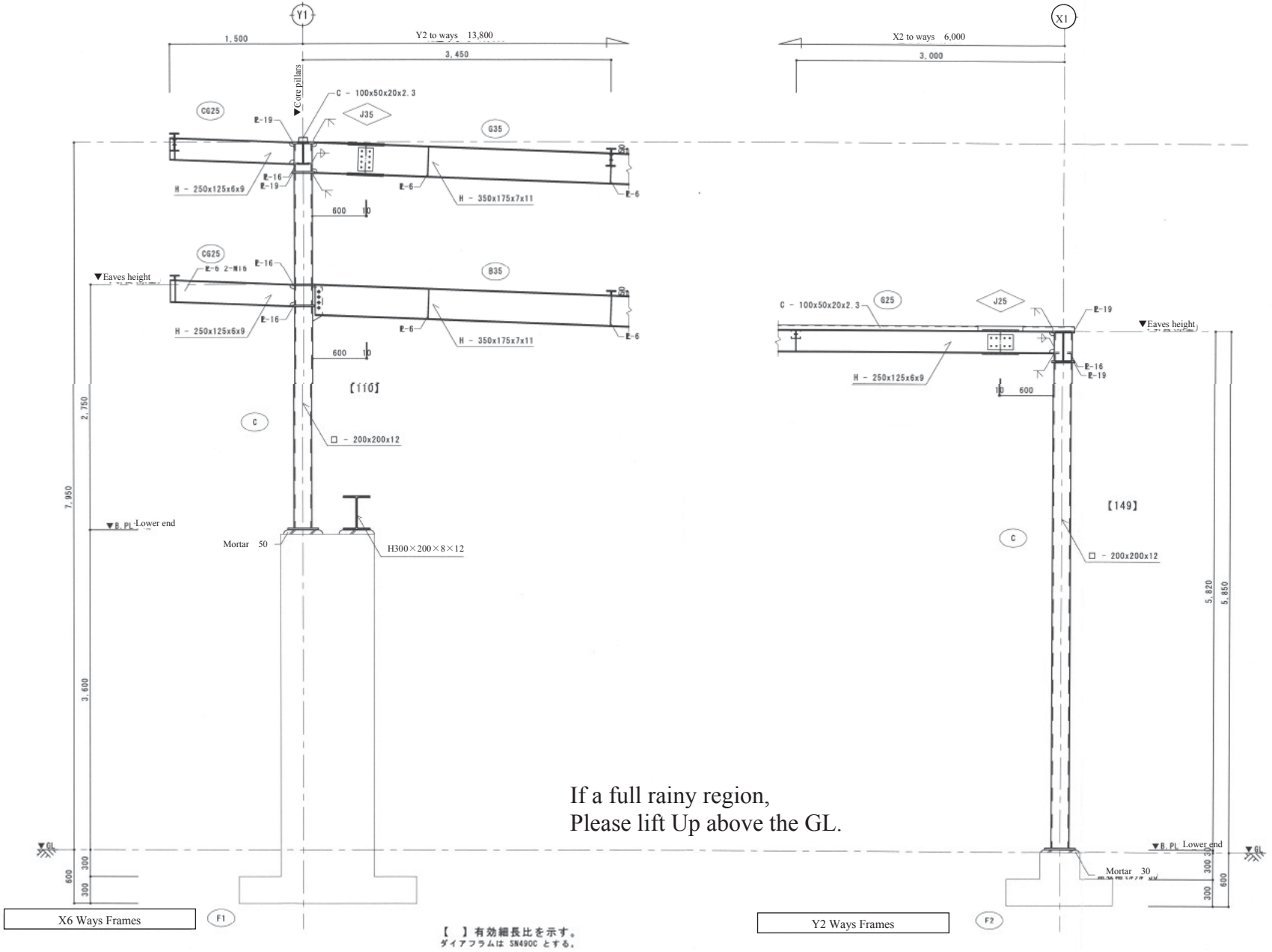
Other bolt F8T : H.T.B

Sign		J35
Appellation		GGF-4X-J3517・0612-16
Member cross-sectional dimension		H-350x175x7x11x13
Cross section		
Flange	SPL	2PL- 9x175x410
		4PL- 9x 70x410
	HTB	24-M16 : L=55
Web	SPL	2PL- 6x260x170
	HTB	8-M16 : L=45
Beams sign		G35
Sign		J25
Appellation		GGF-4X-J2512・0609-16
Member cross-sectional dimension		H-250x125x6x9x8
Cross section		
Flange	SPL	2PL- 12x125x410
	HTB	24-M16 : L=45
Web	SPL	2PL- 6x170x290
	HTB	8-M16 : L=45
Beams sign		G25

Joint list

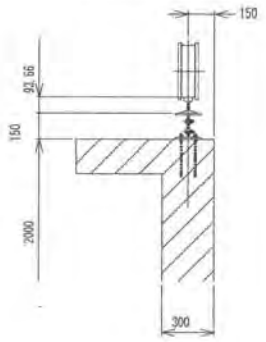
Other bolt F8T : H.T.B

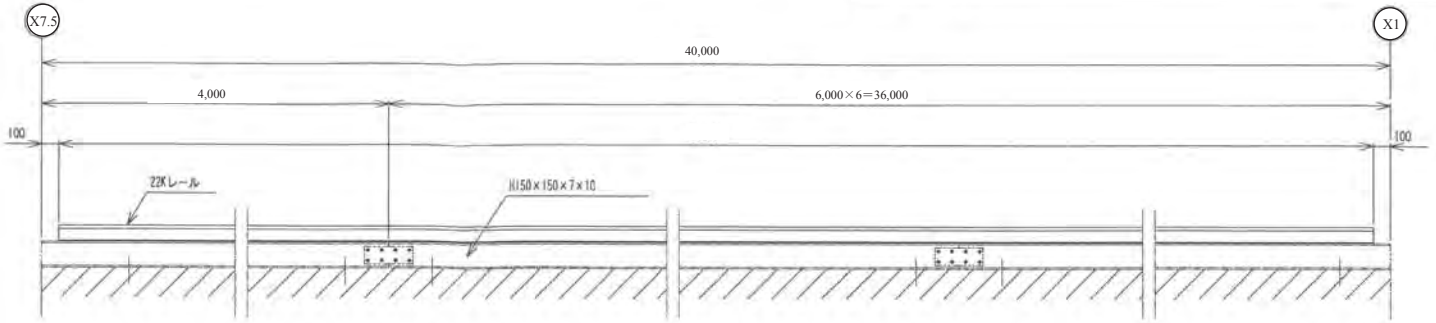
Sign	B35	B19		V
Member	H - 350 x 175 x 7 x 11	H - 198 x 99 x 4.5 x 7		[- 100 x 50 x 5 x 7.5
Cross section		(G35に取付く場合) 	(その他) 	
Plate	PL - 9	PL - 6	PL - 6	PL - 6
Bolt	4 - M20	2 - M20	2 - M16	2 - M16
Sign	S	P		Roof brace
Member	2Cs - 100 x 50 x 20 x 2.3	H - 125 x 125 x 6.5 x 9		M16 Buckle
Cross section				
Plate	PL - 4.5	PL - 6		PL - 9
Bolt	2 - M16	2 - M16		1 - M16
Sign	Horizontal Doen			
Member	C - 100 x 50 x 20 x 2.3 @600			
Member	2Cs - 100 x 50 x 20 x 2.3 @1800			
Cross section				
Plate	L - 100x75x7x10			
Bolt	2 - M12			



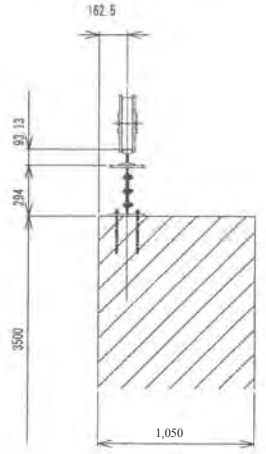
If a full rainy region,
Please lift Up above the GL.

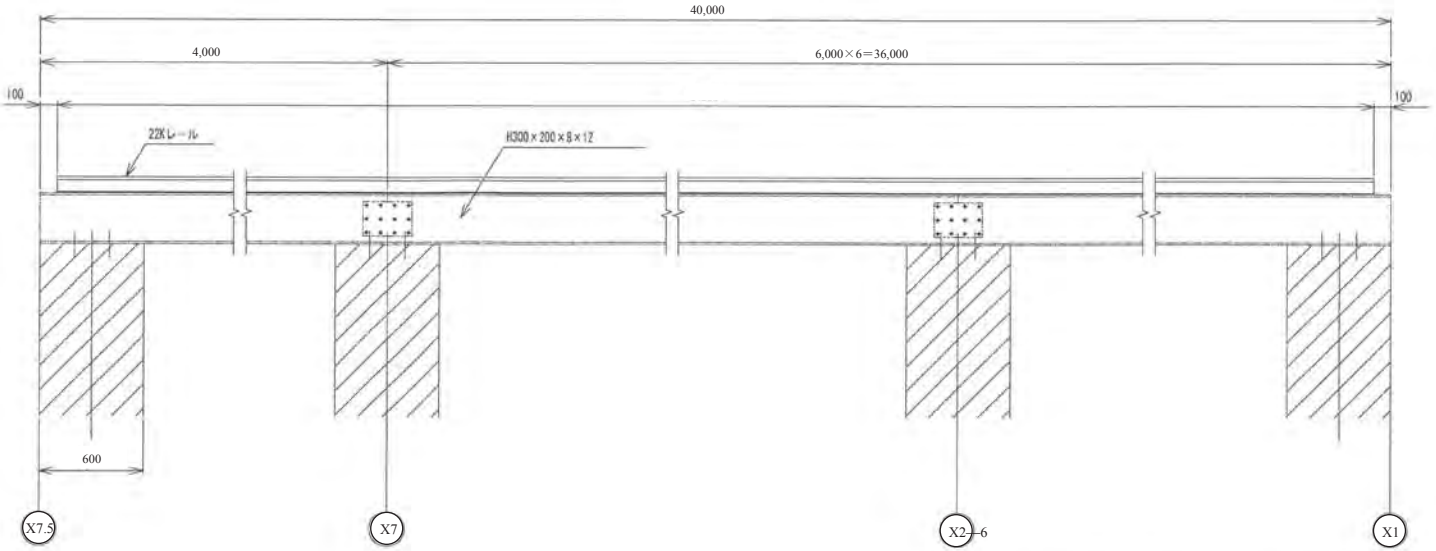
Height of the wall side H=2,000

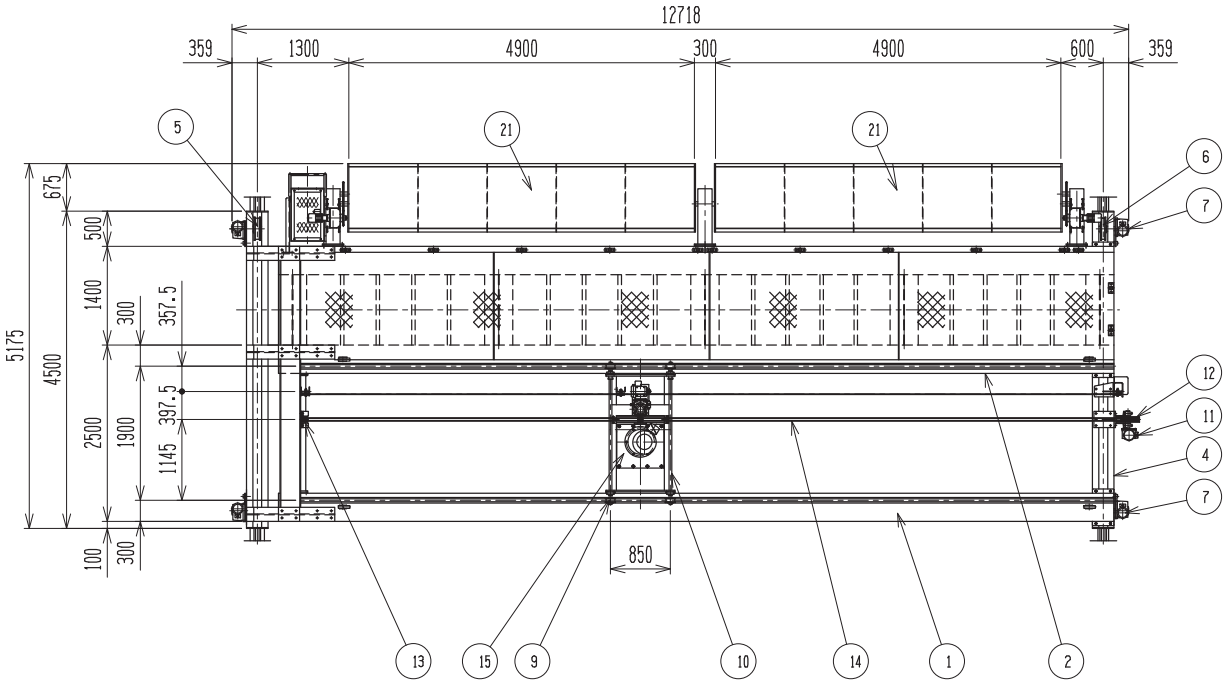




Height of the wall side H=3,500

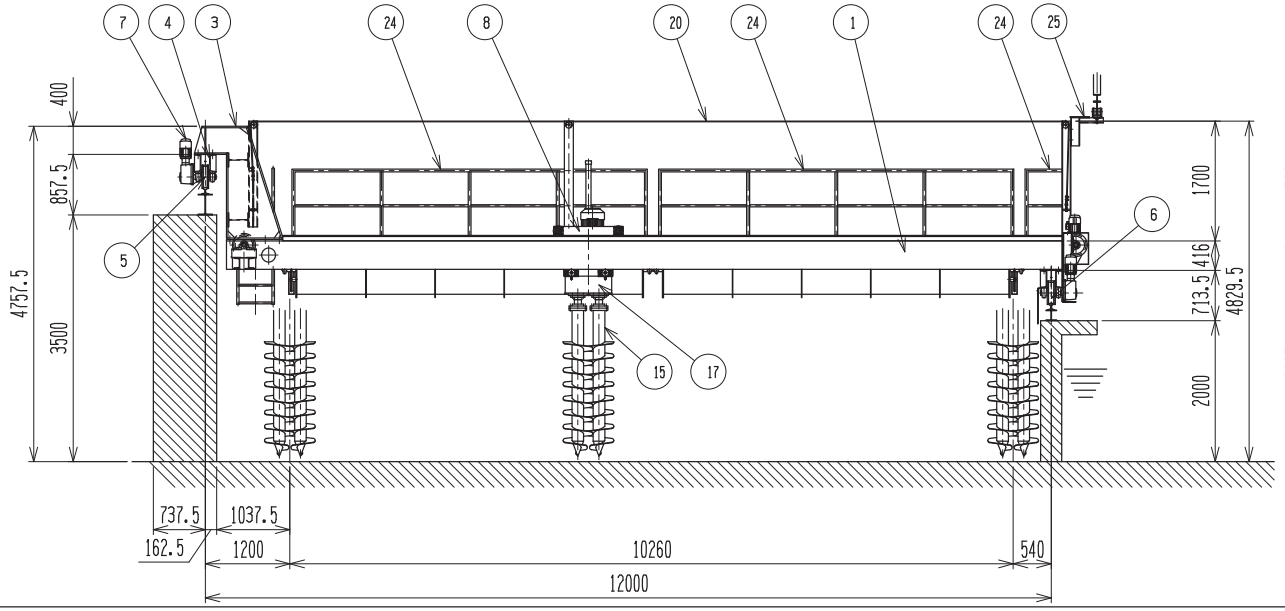


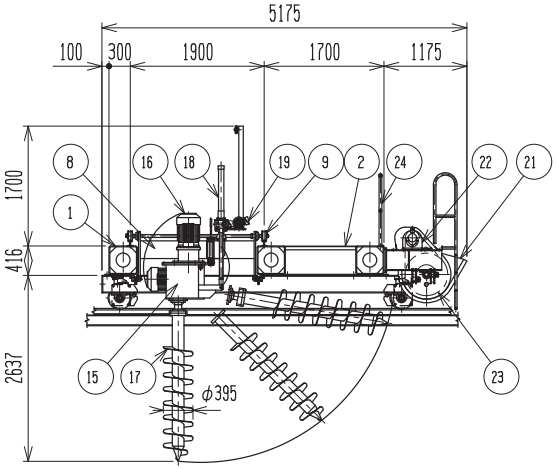




部 品 表

番号	名 称	数量	備 考
1	ガータ(1)	1	
2	ガータ(2)	1	
3	ガータ(3)	1	
4	サドル	2	
5	走行車輪(1)	2	φ300×60
6	走行車輪(2)	2	φ300×75
7	駆動モータ	4	0.75KW×1/300
8	トロリーフレーム	1	
9	横行車輪	4	φ125
10	横行車軸	2	
11	横行駆動モータ	1	0.75×1/160
12	横行用主シーブ	1	PCD φ300
13	横行用従シーブ	1	PCD φ300
14	横行用ワイヤー	2	φ10
15	ギヤーボックス	1	
16	スクリュウ駆動モータ	1	
17	攪拌用スクリュウ	2	φ420
18	スクリュウジャッキ	1	100KN
19	ジャッキ駆動モータ	1	4P×0.75KW
20	ケーブル保持用ワイヤー	1	φ9
21	バケット	2	
22	バケット用モータ	2	0.4KW×1/900
23	駆動チェーン及びスプロケット	2	RS100 NT=20/60
24	安全手摺	2式	□40×2.3 □31×1.6
25	ケーブル移動金具	1	□75×75×4.5





承認	審 査	製図	作図年月日
		近藤	H22.8.27
尺度	1/50	画法	第3角法
株式会社 カワシマ		図面番号	R12H-A-200

図名 コンポスト プラント RAX(R)
全体組立図(部品表付)

資料 3

ステークホルダーミーティング

資料 3-1　ステークホルダーミーティング議事次第
資料 3-2　ステークホルダーミーティング参加者
資料 3-3　ステークホルダーミーティング写真

資料3-1

Organizing Stakeholder Meeting

Verification Survey with the Private Sector for Disseminating Japanese Technologies for Recycling Project of Organic Garbage and Agricultural Waste by Screw Type Composting Plant

1. Objective:
   To introduce feature of the project to local residents, specially householder, in order to improve understanding the importance of separate garbage collection at each household and put the project in operation with resident participation.
   1) The project will make a contribution to solve local garbage problem by producing compost using domestic garbage and agricultural waste.
   2) KAWASHIMA's composting plant is clean plant without generating bad smell, mosquito and fly.
   3) Since the compost is utilized as organic fertilizer for farming, domestic organic garbage has to be collected.

2. Participant (stakeholders): Not less than 50 persons
   1) Local residents, specially householder, in Pathadumbara Pradeshiy
   2) Local residents, specially householder, in Kundasale Pradeshiya
   3) Farmers who intend to purchase compost
   4) Neighborhood of the compost plant and residents living along access roadway

3. Organizer
   1) Pathadumbara Pradeshiya Sabha
   2) Kundasale Pradeshiya Sabha
   3) KAWASIMA; Kenji Kawashima,
      PEAR; Kazuo Sasaki, Gota Deguchi, K.T.B Dharmasir
   4) JICA Sri Lanka Office; Chief Representative, Mr. Kiyoshi Amada
      Representative, Mr. Yusuke Shinozaki
      Chef Project Specialist, Dr. Priyantha Serasinghe

4. Meeting Place: Room containing over 50 stakeholders

5. Date and Bulletin
   Date 10:00 - 11:30, 28th January 2015
   Bulletin 10:00 - 10:10 Opening remarks (the consortium)
   10:10 - 10:20 Opening remarks (chief representative, Mr. Amada)
   10:20 - 10:40 Introduction of the project (the consortium)
   10:40 - 11:00 Introduction of compost plant technology (KAWASIMA)
   11:00 - 11:10 Cooperation request for separate collection at households (the consortium)
   11:10 - 11:35 Questions and answers
   11:35 - 11:40 Closing remarks (the consortium)

6. Notification
   Opening notice of the stakeholder meeting is placed at local newspapers and public relation magazines of local governments. Newspapers and magazines noticed the stakeholder meeting would be attached to the project report.

資料3−2

RECYCLING PROJECT OF ORGANIC GARBAGE AND AGRICULTURAL WASTE BY SCREW TYPE COMPOSTING PLANT

KUNDASALE AND PATHADUMBARA PRADESHIYA SABHA

STAKHOLDER MEETING AT DIGANA VILLAGE – PARTICIPATED SUMMARY LIST

2015- 01- 28

PARTICIPATED WITH INSTITUTION	No Of Paticipants
Chief monk – temple – Allutwatta digana	1
Kundasale PS – political leaders and top staff	7
Pathadumbara PS - political leaders and top staff	5
Central provincial council	3
Central environment authority	1
JICA Sri Lanka Office	2
Kawashima co. Ltd and Sri Lanka representative	3
Medical of health Office	2
Agricultural Officers – Kundasale area	10
House holders – Kundasale area	12
House holders – surrounded area of the plant site	15
House holders – Pathadumbara area	9
Pathadumbara PS – SWM Staff	7
Kundasale PS – SWM Staff	9
Media reporters	2
others	5
TOTAL	**93**

Screw Type Composting Plat.
Stakholder Meeting at Digana Village
2015.01.28

Name	Designation	Institution	Sing
K.K.G. R. Bandara.	A. R. P. A.	Manikhinna	
C.R. Siriwardana	A.R.P.A	Menikhinna	
W.M.C. Menike	A.R.P.A	Menikhinna Ag. Center	
K.S.W.K.B. Padmalatha	A.R.P.A.	Ag. Ca: Menikhinna	
[illegible]			
D.G.H. Menike.	No 38. [illegible]		
[illegible]	No 37 [illegible] 30		
[illegible]	[illegible] 17 "		
M. MUTHUWARASAM	NO 46 T-ARM KOTAWGAPITIYA ALUTHWATTA ROJAGE.		
W.G.R.S. Jayathilaka	ADGA pol Akkara 30		

Recycling Project Of Organic Garbage and Agricultural Waste by Screw Type Composting Plat.

Stakholder Meeting at Digana Village

2015.01.28

Name	Designation	Institution	Sing
[illegible]	[illegible]		[signature]
S. D. W. Seneviratne.	S. W.	Kundasale. P. Sabha.	[signature]
P. H. Dhammarathna	SEC, P.P.S	P. P. S	[signature]
G.G.S. Parakrama	P.S.M.	P.P.S.	[signature]
K.K.G.R. Bandara.	A.R.P.A	Menikhinna	[signature]
C.R. Siriwardana	A.A.P.A	Menikhinna	[signature]
W.M.C. Menike	A.R. and P.A	Menikhinna	[signature]
K.S.W.K.B. Pathiratne	A.R.P.A.	Manikhinna	[signature]
H.P. Jayatissa.	E/O KUPS.	Kundasale PS	[signature]
R.G.B. Kulasekara	R.I.	Kundasale PS	[signature]
K.M.R.D.B. Dissanayake	PHI	MOH office Menikhinna	[signature]
R.M [illegible]	[illegible]	[illegible]	[signature]
R.M [illegible]	[illegible]	[illegible]	[signature]
G.S. [illegible]	[illegible]	[illegible]	[signature]
Y.M. [illegible]	[illegible]	[illegible]	[signature]
D.G. [illegible]	[illegible]	[illegible]	[signature]

Screw Type Composting Plat.
Stakholder Meeting at Digana Village
2015.01.28

Name	Designation	Institution	Sing
W.K.G. තිලකරත්න	[illegible]	පාතදුම්බර ප්‍රාදේශීය සභාව	[illegible]
R.M.J.B. බණ්ඩාර	[illegible]	පාතදුම්බර ප්‍රාදේශීය සභාව	ජේ.බී. බණ්ඩාර
[illegible]	–	මඩවල	[illegible]
[illegible]		මඩවල	[illegible]
[illegible]		[illegible]	[illegible]
M.F.D.P. Kumarasinhge	—	Madawala	[illegible]
නිමල්	—	මඩවල	නිමල්
H.M.P.G. Priyantha		Kundasale.	[illegible]
V.G. [illegible]	–	[illegible]	[illegible]
D.G. [illegible]		[illegible]	[illegible]
M.G. [illegible]	–	[illegible]	[illegible]
H.M. [illegible]		[illegible]	[illegible]
Y.M.J.K. [illegible]	—	[illegible]	[illegible]
D.M. [illegible]	—	[illegible]	[illegible]
L.J. [illegible]		[illegible]	[illegible]
H.A. [illegible]		[illegible]	[illegible]

Screw Type Composting Plat.
Stakholder Meeting at Digana Village
2015.01.28

Name	Designation	Institution	Sing
[illegible]	-	[illegible] 30	
[illegible]		[illegible]	
[illegible]		[illegible]	
[illegible]		[illegible]	
4. M. Sanjeewani Abyarathna.		56, Paranaggapitiya, Alathugatha.	
A. P. R [illegible]		[illegible]	
S. Kanishkaran.		[illegible]	
D. S. P. Karunarathne.		120/1B Madhu.	
[illegible]		[illegible]	
R. M. S. [illegible]		[illegible]	
[illegible]		[illegible]	
P. M. H [illegible]		[illegible]	
[illegible]		[illegible]	
[illegible]		[illegible]	
M. MUTHUMARANAM	[illegible]		
Lalith K. Ranthilaka	Environmental officer	PDPS.	

Screw Type Composting Plat.
Stakholder Meeting at Digana Village
2015.01.28

Name	Designation	Institution	Sing
Kiyoshi AMADA	Chief Rep.	JICA	
W.M.S.B Welagedara	chairman	Pallethambe PS	
R.B Kaphkotuna	member S.	Kundasale	
Sajeewa Witharage	Deputy Director	Chief Secretariat C.P.	
Dharmasiri Kariyawasam	Pear Carbon		
Kenji Kawashima	KAWASHIMA CO.LTD		
G.U. Gunasinghe	Secetary	KUPS-Menikhinna	
T Kiriella	Director	CBA	
Rev. W. Pemalankara	chief monks	Viharaya-Digana	
N. Jayawardana	Farmer Gf.	Lebe House	
H.P. Jayathissa.	E/O.	Kundasale P/S	
R.G.B. Kulasekara	R.P.	Kundasale P/S	
K.M.P.D.B.D. Senayake	PHI-	MOH Menikhinna.	
P.H. Dharmarathna	secetary	P.P.S	
G.G.S. Perakrama	m.P.	P.D.P.S	
K.A.L. Abeyratne	T.O	P.D.P.C	

資料 4

家庭ゴミ分別活動

資料 4-1　PATHADUMBARA 家庭ゴミ分別活動

資料 4-2　KUNDASALE 家庭ゴミ分別活動

資料4-1

RECYCLING PROJECT OF ORGANIC GARBAGE AND AGRICULTURAL WASTE BY SCREW TYPE COMPOSTING PLANT – PATHADUMBARA AND KUNDASALE PRADESHIYA SABHA

IMPLEMENTED AWARENESS PROGRAM AND ACTIVITIES AFTER THE JAPAN TRAINNING PROGRAME

ENVIRONMENT SECTION PATHADUMBARA PRADESHIYA SABHA

NO – 01

Waste separation and thakakura home composting system

At Kahalla viharaya for Kahalla house holders

2015 – 09 - 11

NO 02

Waste separation and Health program for dhamma school children

At Pathadumbara PS Auditorium

2015 – 09 – 11

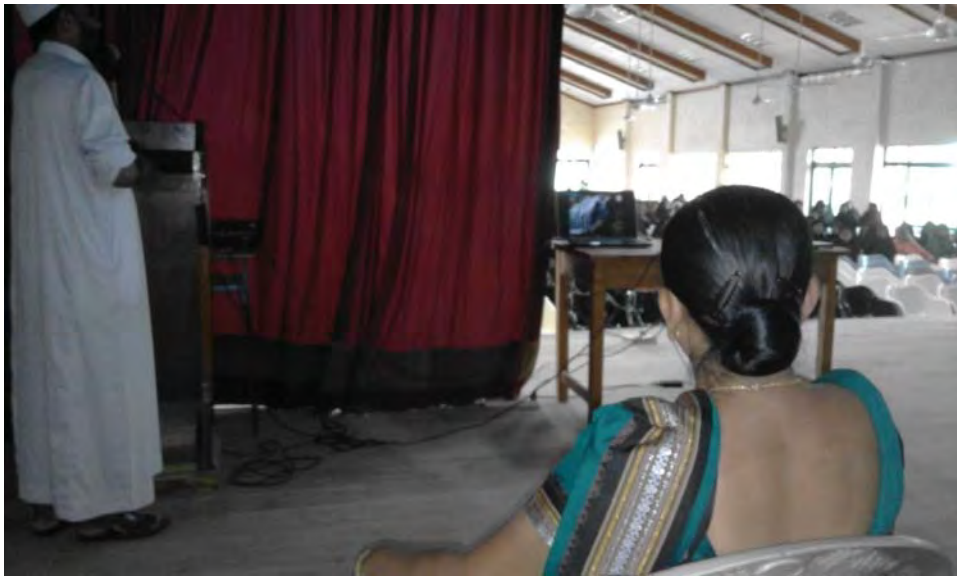
NO 03

How to waste separation in house and how to dispose separated waste

The awareness Program for Muslim female house holders

At Madeena National school Auditorium Madawala

2015 – 10 – 17



NO 04

Waste separation program for school children

At Madeena National school Auditorium Madawala

2015 – 09 – 10

NO 05

Industrial Waste Management such as saw mills, rice mills, farmers, bricks industries owners etc.

At Pathadumbara PS Auditorium

2015 – 09 – 10

NO 06

Plastic Bins and composting Bins distributed program for House holders.

Madawala Area

2015.09.11

NO 07

Waste separation awareness program for parents

At madawala almunauwara primary school hall

2015.06.05

No 08

Waste separation Leaflet distribution program shop to Shop in madawala Town Area

The program conducted by central environment Authority and pathadumbara p.s

The program imgletnented by

School Environmental pilot

2015.06.05

NO 09

Environment clean and awareness program at pathadumbara office and madawala town Area

The program conducted by Pathadumbara Pradeshiya Sabha

participated – Road development authority

pathadumbara pradeshiya sabha

Medical officer of health office

2015.06.05

No 10

Solid waste management in pre school and house

The Awareness program conducted by PDPS and MOH office for pre school children with parents

2015.09.09

資料 4-2

KUNDASALE PRADESHIYA SABHA - SOLID WASTE MANAGEMENT PROGRAM

Waste Separation Awareness program for Digana City

Waste separation Awareness street drama program for Digana city 2015.09.11

Waste separation Awareness program for Government Officer in Kundasale Area 2015.09.13

Nun degradable separated waste collection program in Digana City 2015.09.11

Waste separation Awareness program for Rajawella Primary school children 2015.09.11

Waste separation practical awareness program for shop to shop in Menikhinna City 2015.10.23

Waste separation practical awareness for shop to shop in Digana City