



Introduction of 'MOGURINKO'; The Sewer Pipe Inspection Robot Series

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Presentation Outline

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<Robot developed with financial assistance from Kitakyushu City's New technology development subsidy program>

1. About Mogurinko Series

Low Cost Handy Robot, 'Mogurinko'

The objective of conducting 'screening examinations' in the medical sector is to handle massive volume of testing promptly and at low cost.

Further detailed examinations are conducted on cases which have shown doubtful results. This method is the primary factor which enables the health and long life expectancy for many of our people.

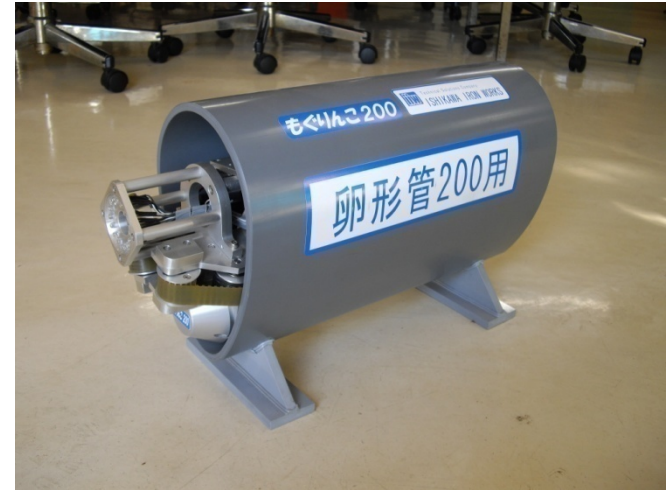
The sewage pipes is a very important lifeline which is equivalent to the human body's venous blood vessels. 'Mogurinko', similarly to the screening examinations, was developed to conduct efficient inspections of sewage pipes.

It is designed to perform with maximum effect with very small cost; and the main feature is it has a very strong travelling power. Its performance ability is by far high even in bad conditions, and despite its low cost, it is an easy robot which enables a speedy and reliable inspections

2. Photo of Mogurinko 200 Series



The Mogurinko set



Mogurinko for egg shaped pipes



Mogurinko o200 Series

3. Details of Mogurinko 200 Series

Main body structure	Drip proof type
Drive Section	‘∩’shaped (patented) Crawler type
Travel Performance	<ul style="list-style-type: none"> · Exclusively to travel inside circular cylinder pipes · Autonomous horizontal movement functions (straight and curves)
Filming	Horizontal : 53° Vertical : 40° Or 190°wide view
Control System	<ul style="list-style-type: none"> · Remote Control and Safety Rope Switch · advance, astem, stop
Pipe Diameter	150A~600A Adapters replaceable
Features	<ul style="list-style-type: none"> · Non-controlled travel inside pipes · Very easy handling · Batteries built in
Price	JPY 800,000~ (1/10~1/20 price compared to competitors)

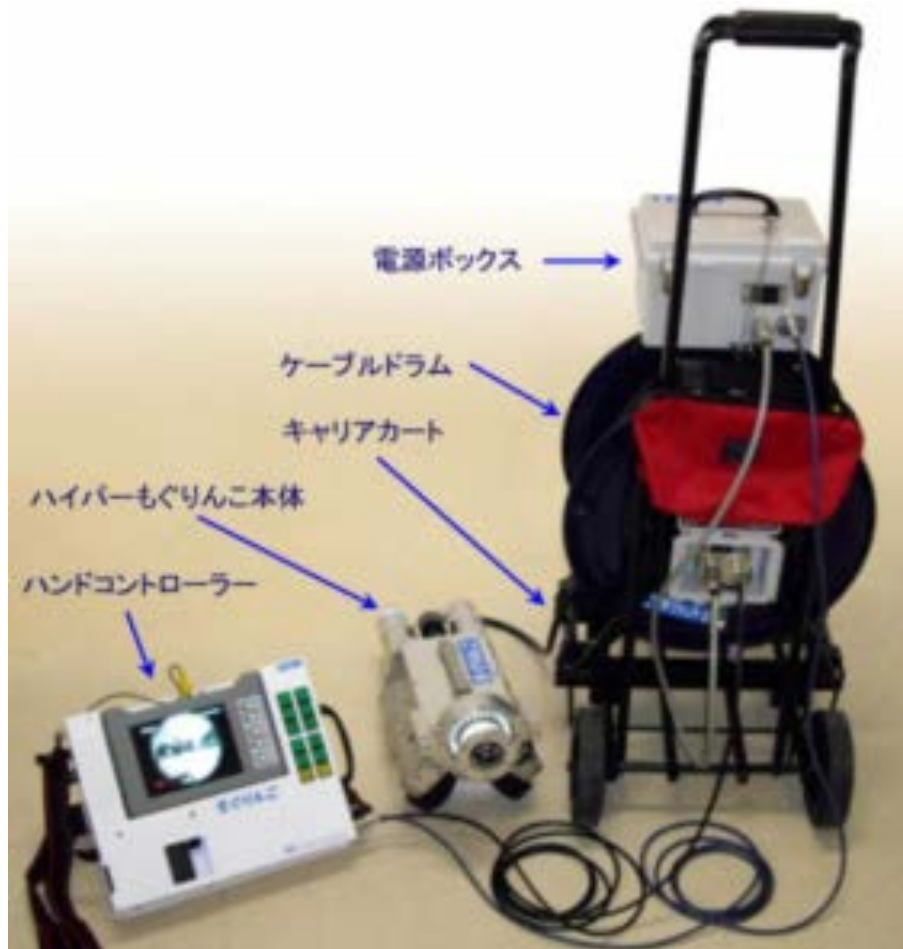
4. Video of Mogurinko 200

Video 1 Mogurinko moving inside a demo pipe



5. The structure of Hyper Mogurinko (1)

The Entire System



Standard Type

- 190Wide lens 380,000 mp camera
- Power: small battery
- 'ハ'shaped 6 wheels (6×6)
- Skid Steers

5. The structure of Hyper Mogurinko (2)

左側面(φ200)



カメラの位置: φ350対応



手元コントローラー
(走行・照明・録画装置)



右側面(φ200)

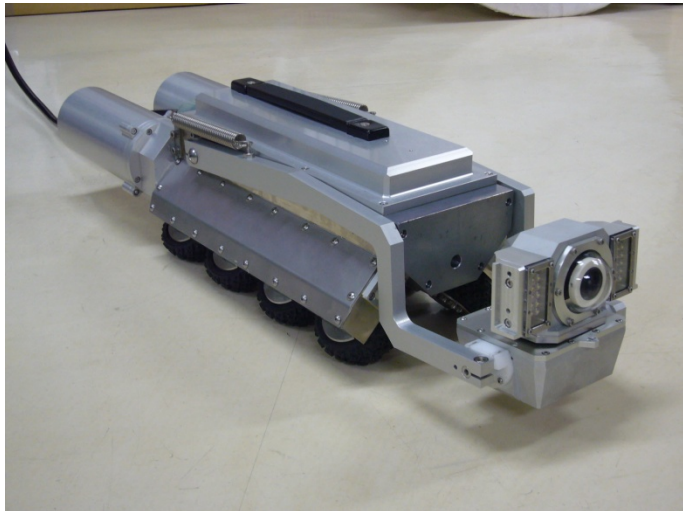


6. Photograph Features (1)



Driving Camera Type

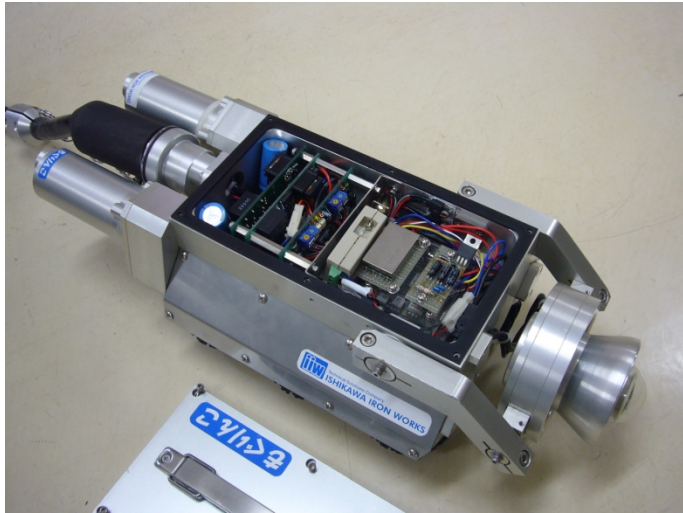
- with standard lens 380,000pixels
- Pan, tilt, up&down movements
- Horizontal circling and shooting rearwards is possible. (Useful when robot is moving backwards)



Long Cruising Type

- Made for agricultural water channels and can travel long distance.
- Power: Small size battery or 100V
- 'ハ' shape 8 tires (8 × 8)
Skid Steering

6. Photograph Features (2)



Gyroscope loaded type

- Can measure pipe angle
- Can correlate to camera photo



Can work inside the pipes

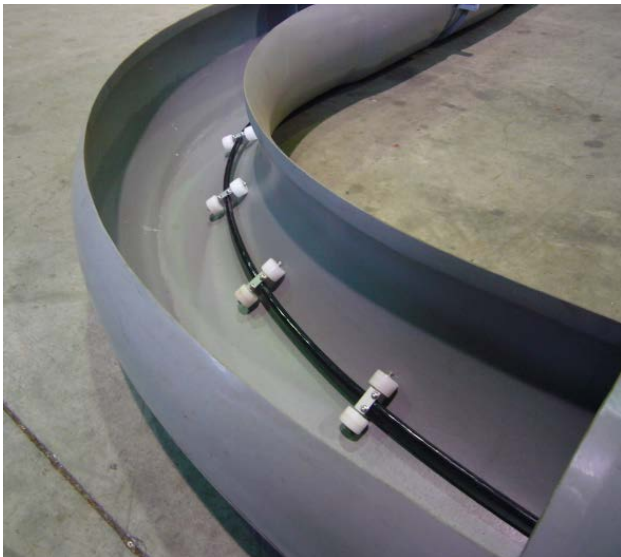
- Has detachable drill unit
- Has towage system by Hyper Mogurinko
- Can be used to fix buried pipes

6. Photograph Features (3)



Bent Pipe Cruising type

- Can apply to plant pipes
Emphasis on bent pipe cruising
- Can autonomously travel in bent pipes
Can be combined with cable rollers
- Can travel inside bent pipes continuously
by forward travel movement



7. Gas Plant under construction in UAE



“Heat Desert Arab type”

Currently 11 Hyper mogurinko is working in the Arab area



配管内に「ハイパーもぐりんこ」をセット



管内の状況をモニターで確認



検査結果問題なし OK

8.Details of Hyper Mogurinko

Structure	water proof
Drive Section	‘ハ’shaped (patented) 6 wheels (6×6) Skid Steers
Travel Performance	<ul style="list-style-type: none"> ▪ Autonomous horizontal movement functions (two speed levels: high speed and low speed) ▪ able to spin ▪ can run under water
Filming	<ul style="list-style-type: none"> ▪ 190° wide lens ▪ Can tilt, can adjust height
Control System	<ul style="list-style-type: none"> ▪ wired controller type ▪ PC controller type
Pipe Diameter	200~350A and above
Features	<ul style="list-style-type: none"> ▪ Non-controlled travel inside pipes ▪ has position sensors ▪ Able to travel on dirt (uncleaned pipe)
price	JPY2,300,000~ (1/5~1/10 price of other competitors)

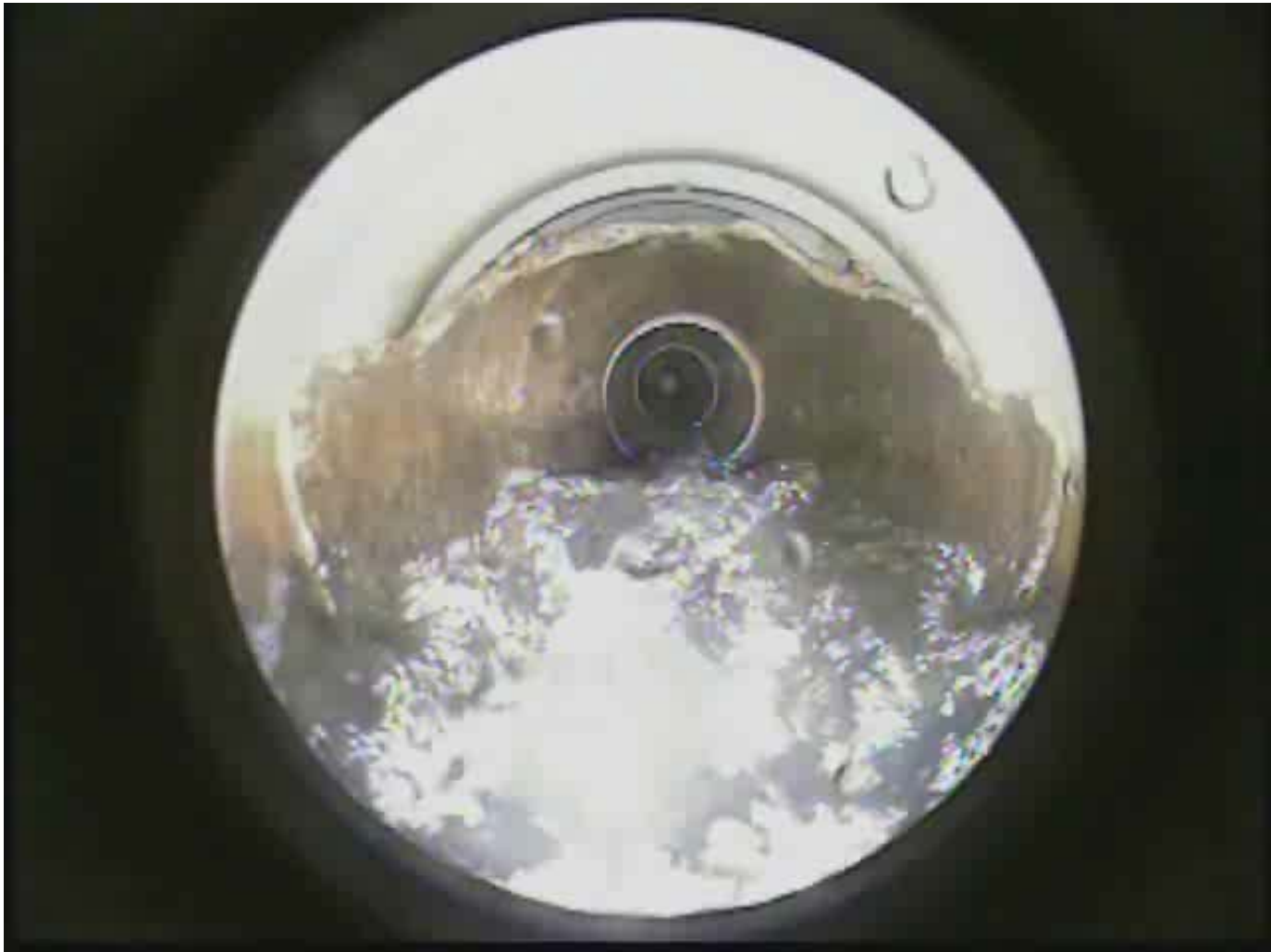
9. Hyper Mogurinko (video)

動画2. Storm water pipes Clogged with sediment and accumulated soil



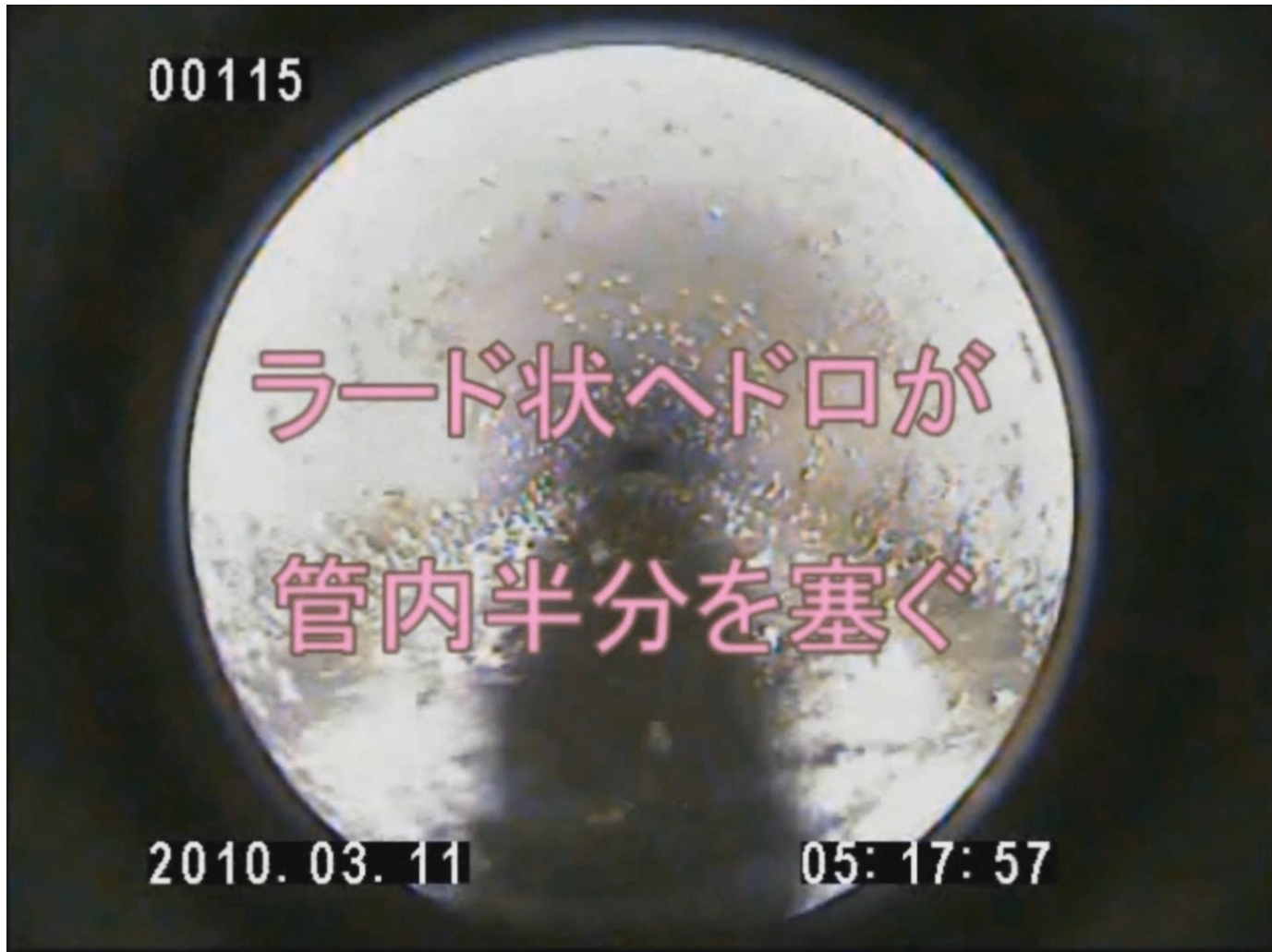
9. Hyper Mogurinko Video (2)

動画3. 伏び配管 流水中半水没での走行 (57秒)



9. Hyper Mogurinko Video (3)

動画4. ラード状ヘドロが管内半分を塞ぐ(45秒)



9. Hyper Mogurinko Video (4)

動画5. 未洗浄配管 下水管へのセット～吊り棒による回収(48秒)



10. Photos of Mogurinko Max



Mogurinko Max



Testing



11. Details of Mogurinko max

本体構造	防水型
駆動部	14”装輪 4駆 スキッドステアリング方式
走行性能	<ul style="list-style-type: none">・大径管内、平地走行可(高速・低速の2速)・超信地旋回可(その場所での旋回)・水中、泥土、瓦礫、路面走行可
映像	・光学ズーム 35倍 高画質
	<ul style="list-style-type: none">・カメラ駆動 パン350° チルト350°・カメラ高さ調整可
制御装置	<ul style="list-style-type: none">・PC制御・画像、走行距離、ジャイロデータ 編集ソフト付
対象管径	800～2000A以上 制限なし
特徴	<ul style="list-style-type: none">・強力なトルク・人間が歩行困難な超軟質泥土上の走行も可能
価格	¥4,800,000～ (他社製品比較 1/10～1/20)



12. Mogurinko Max Video

動画6. パイプ点検状況 (1分40秒)

もぐりんこマックス
パイプ点検状況



Introduction to Mogurinko Series

End

Thank you for your attention

Ishikawa Iron works