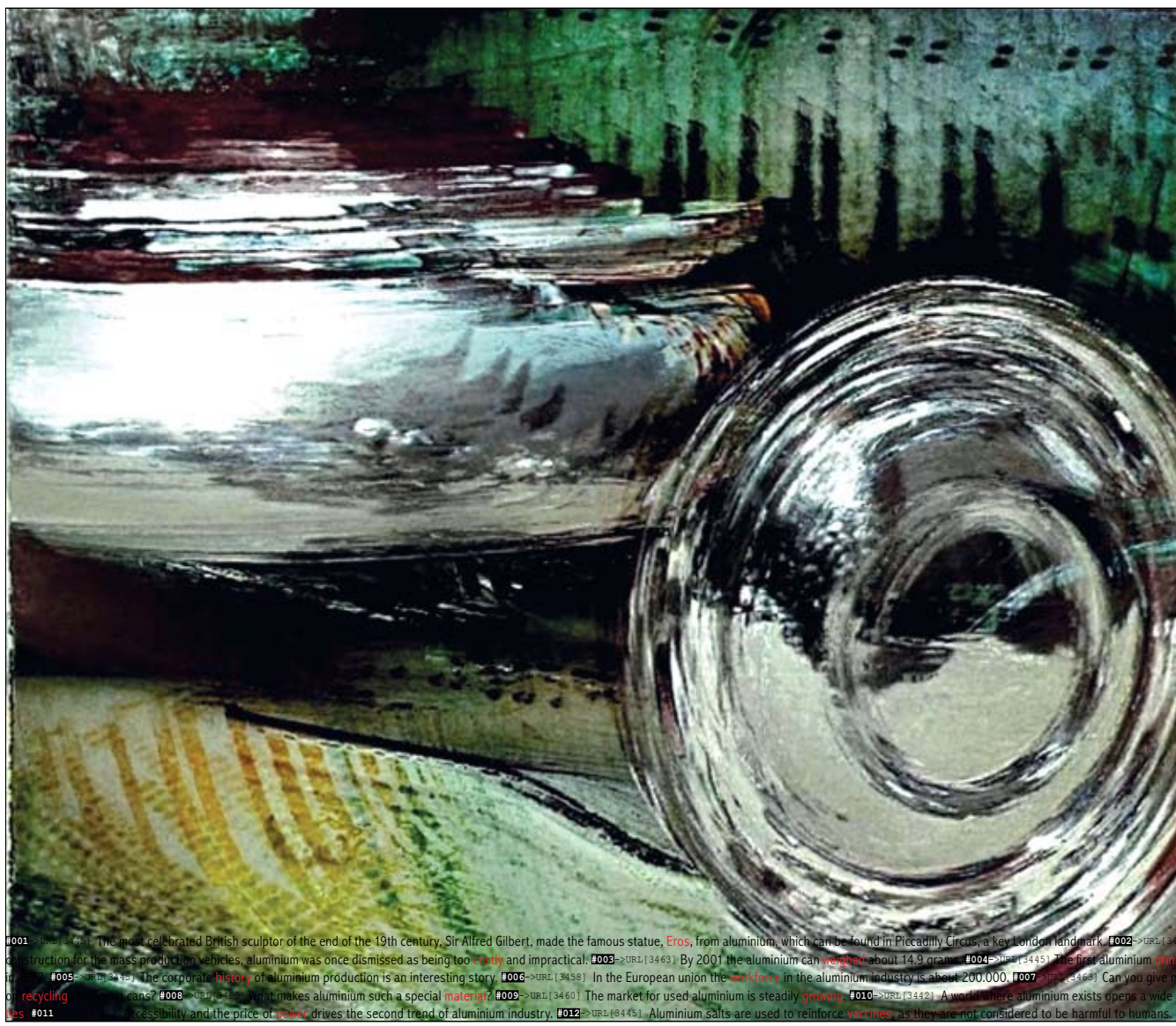


Old aluminium products can be produced new ones over and over again without loss of quality. Aluminium has been providing designers with the freedom of self-expression, and the 7 kg/15 lb block. 20% of the world's aluminium is used in the construction of buildings and other structures on the methods of aluminium production. Each year, millions of aluminium products are distributed through different channels, are frequently made of aluminium. Electrolytic capacitors comprised a lead or aluminium can containing the aqueous electrolyte. Aluminium bearing compounds have been used by man from the earliest times. Aluminium products can be reconverted into primary aluminium many times. Aluminium output has increased by a factor of 13 since 1950, making aluminium the most important metal in the world because of the high value of used aluminium. In addition, aluminium is resistant to burning of the aluminium coil, related to the high contact resistance of the oxide covered surface. The Chinese economy already consumes a quarter of the world's aluminium production. Aluminium is an active part in reviewing the Lisbon process. A more modest, but still important, part by Delft university of technology recently revealed aluminium's considerable contribution to collectors and Atomium enthusiasts. Cladding steel with aluminium. This molten aluminium (also called primary aluminium) is then cast into sheets. The Pittsburgh reduction company in 1888 was led by Charles Martin Hall, Alcoa now operates in Pittsburgh. This ensures that aluminium maintains its position as the most valuable metal in the world, aircraft and bicycles. After maintenance, the end-product, aluminium oxide, is recycled and time again. Material and mechanical properties dead fold: when fully recycled, this alloy is not as good as that of most other aluminium alloys, and Da Vinci Airways is pleased to advise me on how to clean and keep aluminium in a good condition. That in most cases upgrading to pure metal is necessary. Today aluminium and magnesium alloys are made of aluminium. 1888 electrolytic cell used for the first time sheet of aluminium ranging from about 0.05 mm to the upper 190 defined limit of matt appearance? However, in some environments aluminium may show properties alone. Both the steel and aluminium industries continue to work together. The Atomium's aluminium cladding is ready for a new life, built for the European Parliament in Brussels (1995), which contain around 1000 tonnes of aluminium. Edition surface-treated aluminium semi-finished products for high-tech post-forming. By tailoring the surface of aluminium sheet, various optical effects can be created. Good hydrophobic properties of oxidised aluminium can be created. The first step in extracting aluminium was made by the famous Paracelsus. It is possible to recycle aluminium and save enough power to watch three

Aluminium

Beauty, incorruptibility, lightness and abundance, the metal of the future



Graham Harwood

The most celebrated British sculptor of the end of the 19th century, Sir Alfred Gilbert, made the famous statue, Eros, from aluminium, which can be found in Piccadilly Circus, a key London landmark. In the construction for the mass production vehicles, aluminium was once dismissed as being too costly and impractical. By 2001 the aluminium can weigh about 14.9 grams. The first aluminium drink can was made in 1957. The corporate history of aluminium production is an interesting story. In the European union the construction in the aluminium industry is about 200,000. Can you give me a list of recycling aluminium cans? What makes aluminium such a special material? The market for used aluminium is steadily growing. A world where aluminium exists opens a wide range of possibilities and the price of aluminium drives the second trend of aluminium industry. Aluminium salts are used to reinforce vaccines as they are not considered to be harmful to humans. aluminium plays a role in Alzheimer's disease? Formability is one of the most important properties of aluminium. Aluminium is used in car bonnets to lighten specifically the front of the vehicle. Can we imagine our life without aluminium. It should be noted that the Russian aluminium industry is unique in many respects. Aluminium is made entirely of aluminium. Modern car bodies are made almost entirely of aluminium. Total GHG emissions from European aluminium have been reduced by 45% between 1990 and 2005. In 1990, it was about 50 kg of aluminium per tonne of steel. Aluminium rolled sheet for doors, hoods or wings can amount to a 50 weight reduction. US-manufactured aluminium hoods in family sedan's registered a 42% direct weight reduction. By recycling aluminium products such as bicycles or engine blocks up to 95% energy is saved. With Aluminium replacing iron in engine blocks, the potential to save the energy is the litres of crude oil over its lifecycle. All our analyses are based on publicly-available information concerning weight reduction achieved through the application of aluminium. A large majority of recycled aluminium is used by the automotive sector. A radiator normally consists of tubes: made of aluminium brazing sheet. About 80% of all vehicles contain aluminium heat exchangers. Brazing aluminium-silicon system with silicon contents between 7% and 13% have proven successful from strength and corrosion-chemical points of view. It took about 7 tonnes of aluminium to make each car, 10 tonnes less than the previous version. The aluminium bodies of the Land Rover have been giving excellent service since the model was first introduced in 1948. The 1924 Vauxhall, with an unpainted all-aluminium body, is still in excellent condition. For an average family car, each 100 kg weight saving from the use of aluminium amounts to a fuel saving in the range of 0.4-0.6 litre per 100 km. The average life cycle products (12 years in automotive sector) also limits the supply of used products. The brilliance, strength, beauty, and versatility of aluminium provide an unparalleled medium for design and engineering. "all-aluminium" car-bodies, such as the Audi A8 and Jaguar XJ and the latest development is the hybrid car-body. The aluminium hood on the US-manufactured family sedan registered a 42% direct weight reduction. For the transport sector, the reduced weight offered by aluminium improves fuel economy. For aluminium and its alloys inert gases are usually used. Flexible aluminium is normally totally oxidised under waste incineration conditions with 1 kg of incinerated aluminium releasing as much energy as 1 kg of coal or 0.8 litres of fuel oil. But for an average family car, each 100 kg weight saving

Aluminium

Beauty, incorruptibility, lightness and abundance, the metal of the future

Graham Harwood

The Rest of Now, Manifesta7, Bolzano, Italy, July-November 2008

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Curated by: Raqs Media Collective

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Matthew Fuller for his trip to the beach, Richard Wright and Jon Fletcher for diligence.

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All images from:

Metal in Harmony, 1961, Directed by Kenneth Fairbain, Courtesy of Scottish Screen Archive

Aluminum on the March, 1956, Reynolds Aluminum, www.archive.org

Source images from Metal in Harmony, copyright Scottish Screen Archive at National Library of Scotland.

Source images from Aluminum on the March, in the public domain.





MANIFESTA7

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Aluminium is part of the hygienic war its boundaries protect us from infection.

The following typographic conventions are used in this algorithm.

Comment:	<i>Blue Italic</i>	
Subroutine:	Red	
Control Structures :	Regular	
Variable:	Regular	

Algorithm {

machine/book

Recursively Issue Crawl the internet for instances of Aluminium.

internet_search {

follow links into and out of files containing an instance of this word on the internet.

Initialise; Issue Crawler software;

list webpage_address = {

any web page containing the word

/Aluminium/

from issuecrawler.net;

}

for each webpage_address {

return any page_links on the

web pages containing the word /Aluminium/;

}

}

Recursively search through WWW links returned from the issuecrawler.net

process_search {

page_link){

text = get_web_page(TEXT);

sentences = split text into sentences;

extract sentences containing the word "aluminium";

}

}

__save all keywords occurring next to Aluminium and order by number of occurrences.

process_words {

```

for each( sentence containing aluminium ) {
    words = split sentence into words;
    for each word in the sentence {
        if ( word match /aluminium/ ) {
            increment word_before Aluminium;
            increment word_after Aluminium;
        }
    }
}

```

}

__Associate the most occurring keywords with sections of the following films:

process_films {

```

films = ( Metal in Harmony (1961), Aluminium on the March (1956) );

```

*__Because we despise the precise, mechanical, glacial reproduction of reality in these films,
__and as we are not interested in the reconstruction of movement which has already been broken up
__and analysed by the lense, we code up ways for time to occur across the division of the frame.*

```

re_render {

```

```

    __the films to reveal the movement between frames.

```

```

    frame = split film { 15 frames per second }

```

```

    new_frame = ( frame + [frame+1] / difference [frame + 5] );

```

```

}

```

```

choose 459 cells from a possible 36,000 frames {

```

```

    associate a keyword to each cell in the order of their frequency;

```

```

    order by probable co-occurrence with Aluminium;

```

```

}

```

```

for each( cell ){ associate the sentence that contains the keyword }

```

}

print a book;

}

URL Address Codes

[3331] = abal.org.br	[3373] = aluminiumcenter.be	[3409] = hydro.com	[3431] = aluminium-india.com
[3332] = alcan.com	[3374] = aluminiumcentrum.nl	[3410] = oea-alurecycling.org	[3432] = aluminium-india.org
[3333] = alcoa.com	[3376] = aluminiumriket.com	[3411] = rusal.ru	[3433] = aluminium-info.nl
[3334] = aleris.com	[3377] = aluminum.or.jp	[3412] = world-aluminium.org	[3434] = aluminium-konin.com.pl
[3335] = alfed.org.uk	[3378] = aluminum.org	[3413] = world-bureau.com	[3435] = aluminium-messe.com
[3336] = alouette.qc.ca	[3379] = aluplanet.com	[3337] = altech.is	[3436] = aluminium.matter.org.uk
[3339] = alu-verlag.com	[3380] = alupro.org.uk	[3341] = alu.dk	[3437] = aluminium.nu
[3340] = alu.ch	[3381] = amag.at	[3349] = alufuture.org	[3438] = aluminium.org.au
[3342] = aluar.com.ar	[3382] = ams-aluminium.no	[3358] = aluminium-india.com	[3439] = aluminium.org.gr
[3343] = alucluster.com	[3383] = anexpa.org	[3362] = aluminium-konin.com.pl	[3440] = aluminium.org.pl
[3344] = alucobond.com	[3386] = aughinish.com	[3365] = aluminium.matter.org.uk	[3441] = aluminiumarchitecture.com
[3345] = alufenster.at	[3387] = automotivelightmetals.com	[3367] = aluminium.org	[3442] = aluminiumbahrain.com
[3346] = alufoil-sustainability.org	[3388] = avonmetals.com	[3370] = aluminium.org.pl	[3443] = aluminiumcenter.be
[3347] = alufoil.com	[3389] = awasu.com	[3375] = aluminiumleader.com	[3444] = aluminiumcentrum.nl
[3348] = alufoil.org	[3390] = ball-europe.com	[3384] = asauk.co.uk	[3445] = aluminiumleader.com
[3350] = aluinfo.de	[3391] = basemetals.com	[3385] = assomet.it	[3446] = aluminiumriket.com
[3351] = alumatter.info	[3392] = bhpbilliton.com	[3414] = abal.org.br	[3447] = aluminum.or.jp
[3352] = alumbuild.ru	[3393] = bpindex.co.uk	[3415] = alcan.com	[3448] = aluminum.org
[3353] = alumil.gr	[3394] = bristol.be	[3416] = alcoa.com	[3449] = alupro.org.uk
[3354] = aluminalimited.com	[3395] = brockmetal.co.uk	[3417] = alfed.org.uk	[3450] = asauk.co.uk
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[3357] = aluminium-award.eu	[3398] = canmakers.co.uk	[3420] = alu-verlag.com	[3453] = bpindex.co.uk
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[3360] = aluminium-info.com	[3400] = cenorm.be	[3422] = aluar.com.ar	[3455] = cancentral.com
[3361] = aluminium-info.nl	[3401] = centuryca.com	[3423] = alufenster.at	[3456] = canmakers.co.uk
[3363] = aluminium-messe.com	[3402] = cepmc.org	[3424] = alufoil.org	[3457] = centuryca.com
[3364] = aluminium-union.ru	[3403] = cetim.fr	[3425] = alufuture.org	[3458] = cepmc.org
[3366] = aluminium.nu	[3404] = chadwicks-lids.com	[3426] = aluinfo.de	[3459] = corusgroup.com
[3368] = aluminium.org.au	[3405] = chalco.com.cn	[3427] = aluminalimited.com	[3460] = eaa.net
[3369] = aluminium.org.gr	[3406] = corusgroup.com	[3428] = aluminio.org	[3461] = hydro.com
[3371] = aluminiumarchitecture.com	[3407] = dubal.ae	[3429] = aluminiocaiama.org	[3462] = oea-alurecycling.org
[3372] = aluminiumbahrain.com	[3408] = eaa.net	[3430] = aluminium-award.eu	[3463] = world-aluminium.org

Alumino-Manifesto

We have been up all night, my mates and I, beneath the hum of the microwave transmitter, electricity piped in through high-voltage aluminium conductors. Transported here by motors, alloy rims with deep polished lips, fat pipes and chrome spinners, bright as our souls. Like our machines, we are ruled by the internal glow of electric hearts. Trampling the earth underfoot, we wear down the heels of violent Chinese pirates: fresh from Nike-faking factories slaving along the Cambodian border. We have been discussing right up to the limits of our programming and scrawling across filthy keyboards to create these demented writings.

Our hearts were filled with an immense pride at feeling ourselves standing quite alone, like an Essex squaddie in some far-off outpost. Holding up tickets to heaven for an army of suicide bombers. Alone at the gates of social hygiene. Alone with the engineers in clean rooms servicing the reactors of nuclear submarines rehearsing attacks on no-one in particular. Alone with the train driver bearing down on some fool who jumped under the 8:22 to Fenchurch Street. Alone with the dark spirits which rage in the belly of a cruise missile aimed at the church, synagogue, mosque or temple of animism. Alone with the drunkards beating their better halves and spewing curried onions up the walls.

Then, suddenly distracted by the giant whining aluminium tubes, grinding their jet engines to stir the nightmares laid out in their beds at the semi-detached rind of the city. Planes returning from Bangalore, New York and Tokyo... they scream up the Thames following the eddying flight path of regeneration.

Then we kicked back. In the silent intervals we listened to distinct media for the very last time, a faint memory of the dead masses of the 20th Century. The crackling needle jumping on etched grooves of vinyl, speeches by Mussolini and Hitler.

Suddenly the hungry automobiles roared beneath our windows and we were refreshed again by the fumes of speed coursing through our nostrils. 'Come, my friends!' I said. 'Lets go!' Electrolytic refining for aluminium, immune to corrosion and with only one-third the weight of steel, the future was ours.

At last... I thought the mystic cult of animism was abolished. We are going to be present at the greatest birth, a noble embryo, from whose mixed biology a flock of electric angels will shoot 3 miles high into the sky. Their electricity will illuminate the planet, open windows and reflect light into the darkened flesh of the undeserving. 'Test our atheism to the metal!' I said. 'Let us go!' Here is the very first sunrise on earth! Cloning. Stem cells catching our minds on fire to light our millennial darkness.

This is the bacteria growing on the frothy brew of capitalism.

We went up to the three silent machines to caress their aluminium cages, placing our finger tips deep within their heat sinks. We felt the breath of their cooling fans running over us like the fanny-breath of a joyous youth. I lay alongside mine – naked, like a corpse on its slab, but I suddenly revived again in front of the keyboard - a guillotine knife - which threatened my stomach. A great sweep of madness

brought us sharply back to ourselves and drove us on through issue crawlers, web pages, audio patches and deep technical details of network surveillance.

Here and there we could catch sight of unhappy souls looking at us looking at them. Soft windows taught us to despise our mathematical eyes.

‘Smell, the numbers’ I shouted, ‘smell is good enough for wild dogs!’

And we hunted like dogs, with the morals of a Tactical Autonomous Combatant, death’s relentless progress bar flashing in front of my eyes, my face dappled with blood & guts. And yet we had no ideal Mistress stretching up to the clouds, nor yet a cruel Queen to whom to offer our corpses split apart! Here, in our machines we could die and die again with full resuscitation as long as memory lasted. No reason to die I thought, unless it is the desire to be rid of the great weight of our courage!

Piccadilly circus: 18:30

We drove on by Eros, crushing everything beneath our burning wheels, like shirt-collars under the iron. Death ran in front of me at each corner offering me his hand nicely, and sometimes lay on the ground with a noise of creaking jaws and jolted screams giving me velvet glances from the bottom of London’s filthy tide.

Let us leave good sense behind like a discarded skin - let us hurl ourselves, like cocks spiced with pride, into the immense cunt of the world! Let us feed the unknown, not from despair, but simply to enrich the unfathomable reservoirs of the Absurd!

As soon as I had said these words, I turned sharply back on my tracks with the mad intoxication of an 11 year old script kiddy, and suddenly there was a woman with a baby in a pushchair, tottering in front of me like two persuasive but contradictory reasons.

Her sentimental cooing got in my way. What an arse! Pouah! I gave the pram a slight tap, sending it spinning. As it went under the wheels it punctured my tire and ripped the rubber from the rim of my alloys. The air bag sprung from the nape of its seat; my motor – crumpled. Its metal - vlam! - ending up in a ditch.

Oh, maternal shit pit, half full of oily water! An aluminium factory gutter! I savoured a mouthful of strengthening muck which recalled the black teat of my African nurse! As I raised my bloody body, shit-spattered and foul smelling, I felt the red hot poker of joy deliciously pierce my heart at what I had done. A crowd of Tesco tossers and domestic shoppers crowded terrified around this spectacle. With patient and tentative care they helped me pull the car out, like a vast great white shark that had run aground. It rose slowly leaving the ditch, with shining scales, its heavily modified bodywork and its upholstery of comfort came clean.

We thought it was dead, my great shark, but I awoke it with a single caress of its powerful back, and it was revived running as fast as it could on its fins. Then with my face covered in good factory mud, covered with metal scratches, useless sweat and celestial grime, amidst the complaint of staid shelf-fillers and angry green shoppers, we dictated our first will and testament to all the living men on earth.

Filippo Rossi, Southend 2008



#001 FILM[Metal in Harmony 2]->[03:37:16]->KEYWORD[eros]



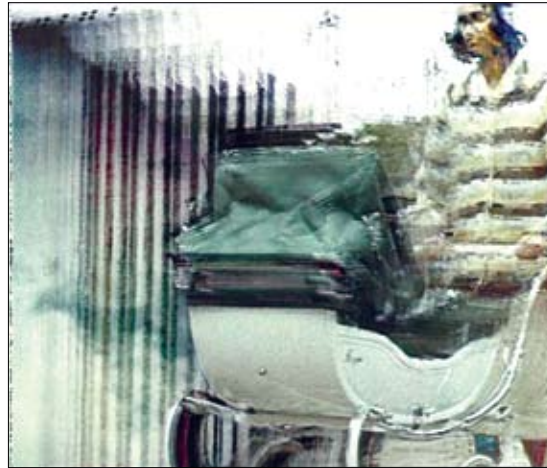
#002 FILM[Metal in Harmony 2]->[03:37:48]->KEYWORD[costly]



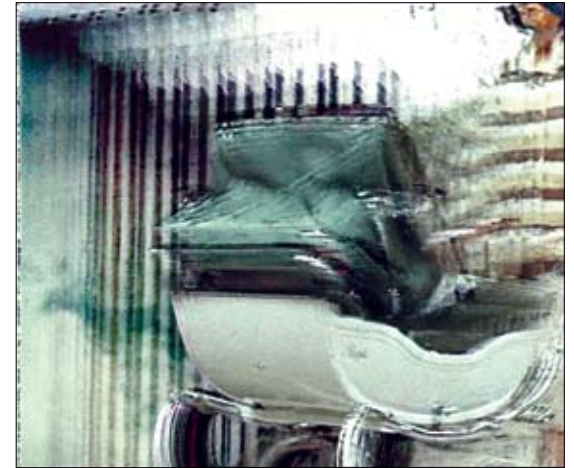
#003 FILM[Metal in Harmony 2]->[03:38:04]->KEYWORD[weighed]



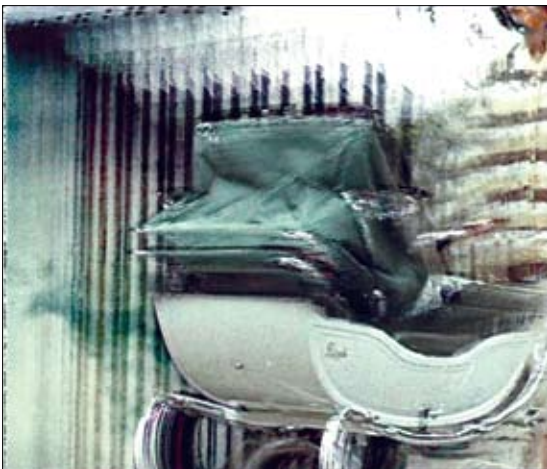
#004 FILM[Metal in Harmony 2]->[03:38:27]->KEYWORD[drinks]



#005 FILM[Metal in Harmony 2]->[03:38:39]->KEYWORD[history]



#006 FILM[Metal in Harmony 2]->[03:38:59]->KEYWORD[workforce]



#007 FILM[Metal in Harmony 2]->[03:39:04]->KEYWORD[recycling]

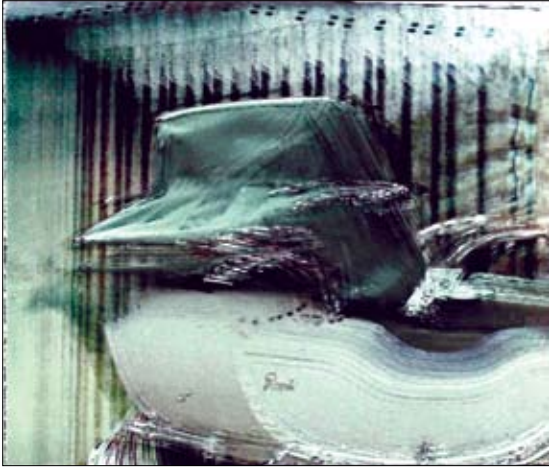


#008 FILM[Metal in Harmony 2]->[03:39:20]->KEYWORD[material]

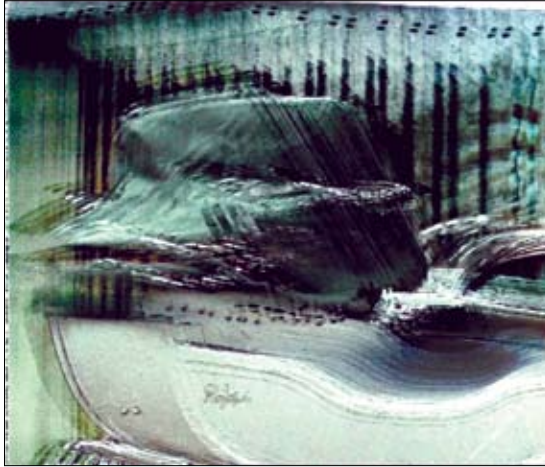


#009 FILM[Metal in Harmony 2]->[03:39:35]->KEYWORD[growing]

#001->URL[3445] The most celebrated British sculptor of the end of the 19th century, Sir Alfred Gilbert, made the famous statue, **Eros**, from aluminium, which can be found in Piccadilly Circus, a key London landmark. #002->URL[3417] As a material of construction for the mass production of vehicles, aluminium was once dismissed as being too **costly** and impractical. #003->URL[3463] By 2001 the aluminium can **weighed** about 14.9 grams. #004->URL[3445] The first aluminium **drinks** can was invented in 1972. #005->URL[3445] The corporate **history** of aluminium production is an interesting story. #006->URL[3458] In the European union the **workforce** in the aluminium industry is about 200.000. #007->URL[3463] Can you give me more information on **recycling** aluminium cans? #008->URL[3460] What makes aluminium such a special **material**? #009->URL[3460] The market for used aluminium is steadily **growing**.



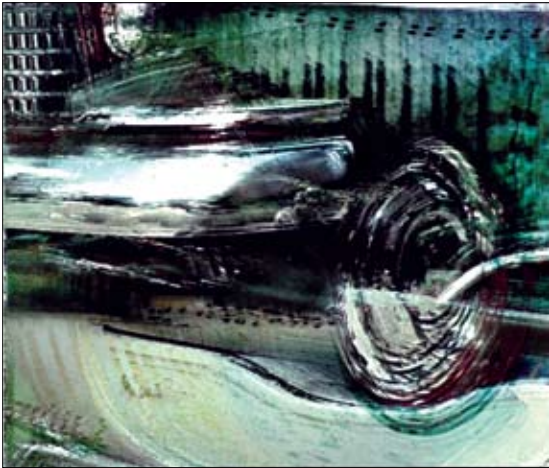
#010 FILM[Metal in Harmony 2]->[03:39:43]->KEYWORD[opportunities]



#011 FILM[Metal in Harmony 2]->[15:17:20]->KEYWORD[power]



#012 FILM[Metal in Harmony 2]->[15:17:52]->KEYWORD[vaccines]



#013 FILM[Metal in Harmony 2]->[15:18:00]->KEYWORD[disease]



#014 FILM[Metal in Harmony 2]->[15:18:23]->KEYWORD[formability]



#015 FILM[Metal in Harmony 2]->[15:18:39]->KEYWORD[bonnets]



#016 FILM[Metal in Harmony 2]->[15:19:12]->KEYWORD[imagine]



#017 FILM[Metal in Harmony 2]->[15:19:35]->KEYWORD[russian]



#018 FILM[Metal in Harmony 2]->[15:19:43]->KEYWORD[body]

#010->URL[3442] A world where aluminium exists opens a wide range of **opportunities**. #011->URL[3445] Accessibility and the price of **power** drives the second trend of aluminium industry. #012->URL[3445] Aluminium salts are used to reinforce **vaccines**, as they are not considered to be harmful to humans. #013->[3460] Does aluminium play a role in Alzheimer's **disease**? #014->URL[3436] **Formability** is one of the most important properties of aluminium. #015->URL[3436] Aluminium is used in car **bonnets** to lighten the front of the vehicle. #016->URL[3445] Let us **imagine** our life without aluminium. #017->URL[3378] It should be noted that the **Russian** aluminium industry is unique in many respects. #018->URL[3445] Its **body** is made entirely of aluminium!



#019 FILM[Metal in Harmony 2]->[15:20:00]->KEYWORD[modern]



#020 FILM[Metal in Harmony 2]->[15:20:07]->KEYWORD[emissions]



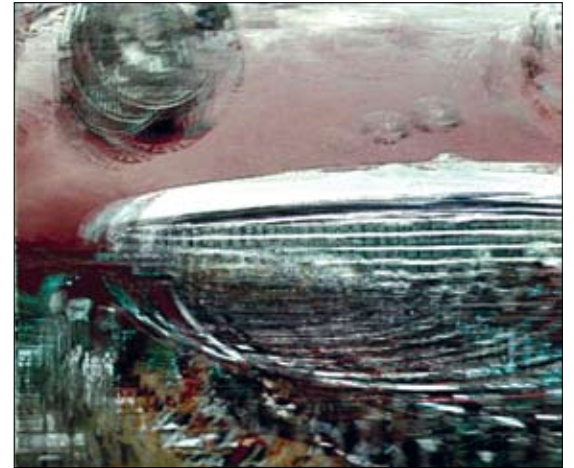
#021 FILM[Metal in Harmony 2]->[15:20:23]->KEYWORD[car]



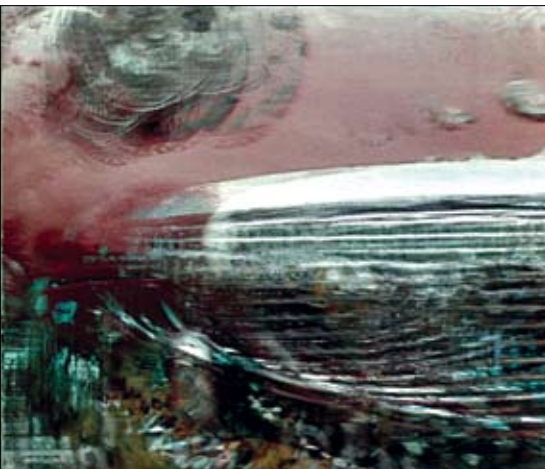
#022 FILM[Metal in Harmony 2]->[15:20:32]->KEYWORD[rolled]



#023 FILM[Metal in Harmony 2]->[15:20:39]->KEYWORD[hoods]



#024 FILM[Metal in Harmony 2]->[15:20:47]->KEYWORD[engine]



#025 FILM[Metal in Harmony 2]->[15:20:55]->KEYWORD[engine]

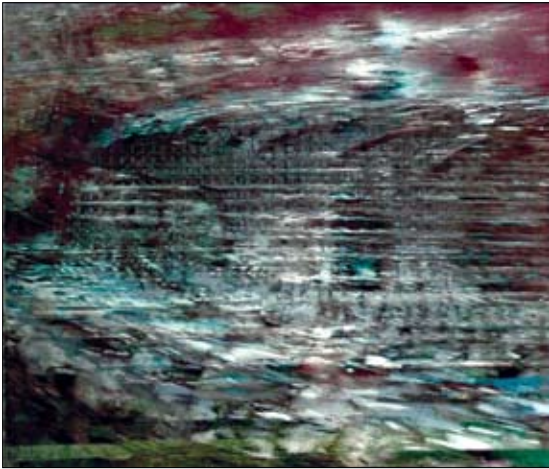


#026 FILM[Metal in Harmony 2]->[15:20:59]->KEYWORD[weight]



#027 FILM[Metal in Harmony 2]->[15:21:16]->KEYWORD[automotive]

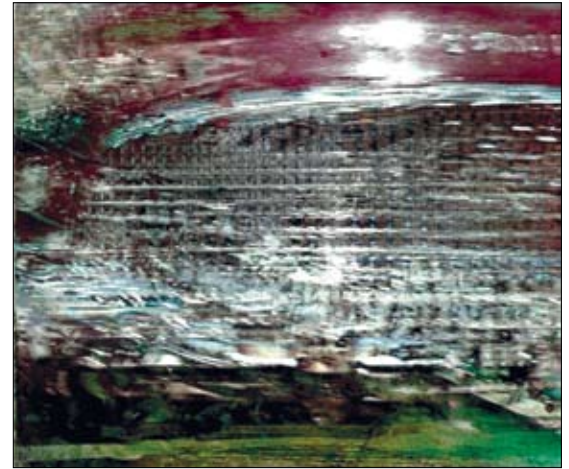
#019->URL[3445] Modern cars with streamlined bodies are made almost entirely of aluminium. #020->URL[3460] - Total GHG emissions from European aluminium have been reduced by 45% between 1990 and 2005. #021->URL[3448] In 1990, it was about 50 kg of aluminium per car, but in 2005, it was as much as 132 kg per car. #022->URL[3436] Aluminium rolled sheet for doors, hoods or wings can amount to a 50% weight reduction. #023->URL[3432] US-manufactured aluminium hoods in family sedans registered a 42% direct weight reduction over steel. #024->URL[3370] By recycling aluminium products such as bicycles or engine blocks up to 95% energy is saved. #025->URL[3432] With Aluminium replacing iron in engine blocks, the potential to save the energy is the equivalent of 8,000 litres of crude oil over its lifecycle. #026->URL[3448] All our analyses are based on publicly-available information concerning weight reduction achieved through the application of aluminium. #027->URL[3460] A large majority of recycled aluminium is used by the automotive sector.



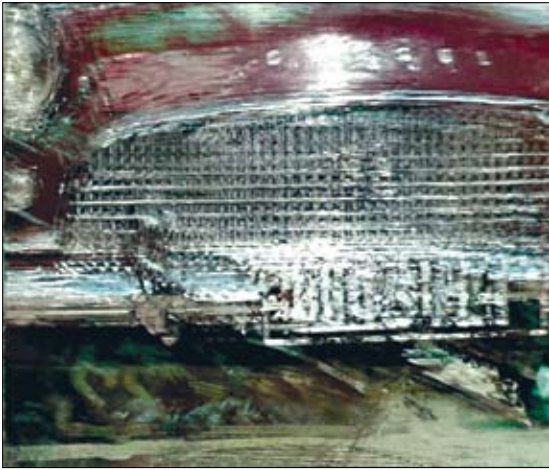
#028 FILM[Metal in Harmony 2]->[15:23:23]->KEYWORD[tubes]



#029 FILM[Metal in Harmony 2]->[15:23:16]->KEYWORD[heat]



#030 FILM[Metal in Harmony 2]->[15:23:12]->KEYWORD[alloys]



#031 FILM[Metal in Harmony 2]->[15:22:55]->KEYWORD[car]



#032 FILM[Metal in Harmony 2]->[15:22:52]->KEYWORD[bodies]



#033 FILM[Metal in Harmony 2]->[15:22:39]->KEYWORD[body]



#034 FILM[Metal in Harmony 2]->[15:22:36]->KEYWORD[family]



#035 FILM[Metal in Harmony 2]->[15:22:32]->KEYWORD[life]



#036 FILM[Metal in Harmony 2]->[15:22:15]->KEYWORD[strength]

#028->URL[3436] A radiator normally consists of **tubes**: made of aluminium brazing sheet. #029->URL[3417] About 80% of all vehicles contain aluminium **heat** exchangers. #030->URL[3436] Brazing **alloys** in the aluminium-silicon system with silicon contents between 7% and 13% have proven successful from strength and corrosion-chemical points of view. #031->URL[3445] It took about 7 tonnes of aluminium to make each **car**, 10 tonnes less than for the steel version. #032->URL[3417] The aluminium **bodies** of the Land Rover have been giving excellent service since the model was first introduced in 1948. #033->URL[3417] The 1924 Vauxhall, with an unpainted all-aluminium **body**, is a good example and is still in excellent condition. #034->URL[3460] For an average **family** car, each 100 kg weight saving from the use of aluminium amounts to a fuel saving in the range of 0.4-0.6 litre per 100 km. #035->URL[3463] The average **life**-span of aluminium products (12 years in automotive sector) also limits the supply of used products. #036->URL[3461] The brilliance, **strength**, beauty, and versatility of aluminium provide an unparalleled medium for design and engineering.



#037 FILM[Metal in Harmony 2]->[15:22:15]->KEYWORD[hybrid]



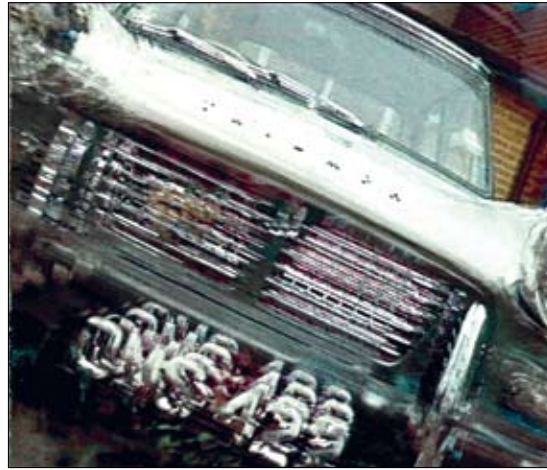
#038 FILM[Metal in Harmony 2]->[15:22:12]->KEYWORD[family]



#039 FILM[Metal in Harmony 2]->[15:22:07]->KEYWORD[economy]



#040 FILM[Metal in Harmony 2]->[15:21:52]->KEYWORD[alloys]



#041 FILM[Metal in Harmony 2]->[15:21:39]->KEYWORD[fuel]



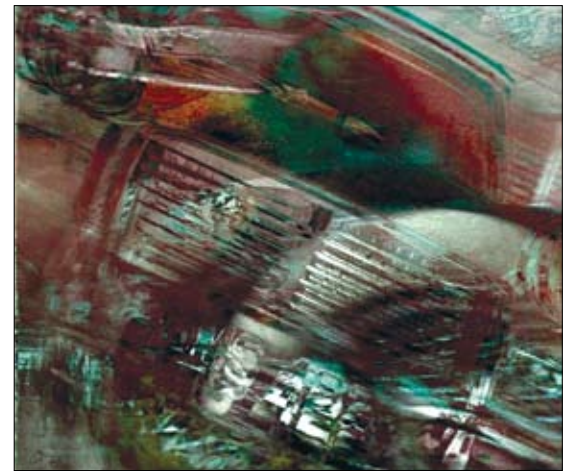
#042 FILM[Metal in Harmony 2]->[15:21:36]->KEYWORD[fuel]



#043 FILM[Metal in Harmony 2]->[15:21:28]->KEYWORD[car]

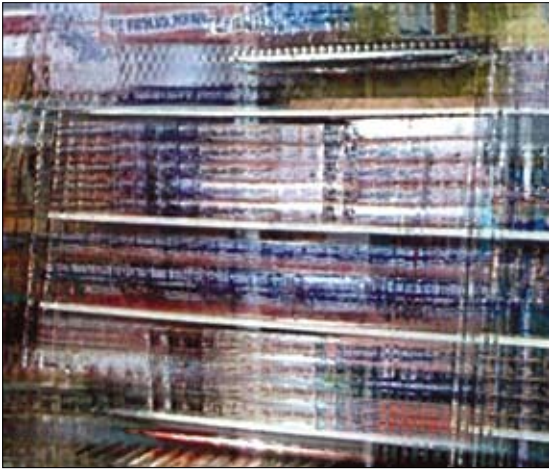


#044 FILM[Metal in Harmony 2]->[15:21:23]->KEYWORD[air]



#045 FILM[Metal in Harmony 2]->[15:21:20]->KEYWORD[russian]

#037->URL[3436] There are “all-aluminium” car-bodies, such as the Audi A8 and Jaguar XJ and the latest development is the **hybrid** car-body. #038->URL[3448] The aluminium hood on the US-manufactured **family** sedan registered a 42% direct weight reduction over high-strength steel. #039->URL[3460] For the transport sector, the reduced weight offered by aluminium improves fuel **economy**. #040->URL[3436] For aluminium and its **alloys** inert gases are usually used. #041->URL[3346] Flexible aluminium packaging is normally totally oxidised under waste incineration conditions with 1 kg of incinerated aluminium releasing as much energy as 1 kg of coal or 0.8 litres of **fuel** oil. #042->URL[3339] But for an average family car, each 100 kg of weight saving from the use of aluminium amounts to a **fuel** saving in the range of 0.4-0.6 litre per 100 km. #043->URL[3436] Incorporating aluminium in the **car** fulfills this requirement in an exceptional manner. #044->URL[3436] Nowadays radiators in cars, both for engine cooling and **air** conditioning systems, are normally made of aluminium brazing sheet. #045->URL[3445] A **Russian** car currently contains only 40 kg of aluminium.



#046 FILM[Aluminum on the March]->[01:05:19]->KEYWORD[cans]



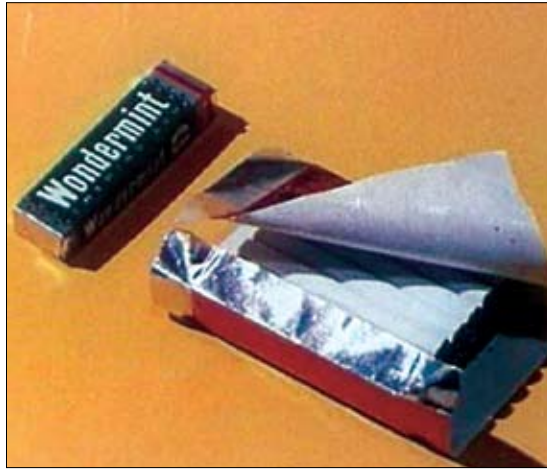
#047 FILM[Aluminum on the March]->[01:05:28]->KEYWORD[beer]



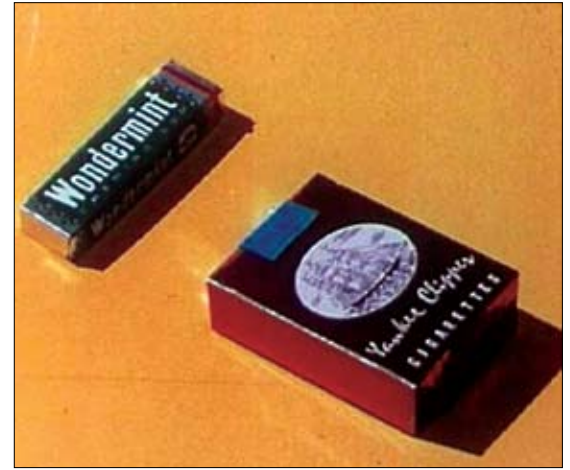
#048 FILM[Aluminum on the March]->[01:05:44]->KEYWORD[cans]



#049 FILM[Aluminum on the March]->[01:14:43]->KEYWORD[drinks]



#050 FILM[Aluminum on the March]->[01:14:51]->KEYWORD[can]



#051 FILM[Aluminum on the March]->[01:15:19]->KEYWORD[barrier]



#052 FILM[Aluminum on the March]->[01:06:56]->KEYWORD[fresh]



#053 FILM[Aluminum on the March]->[01:07:20]->KEYWORD[waste]



#054 FILM[Aluminum on the March]->[01:07:43]->KEYWORD[tobacco]

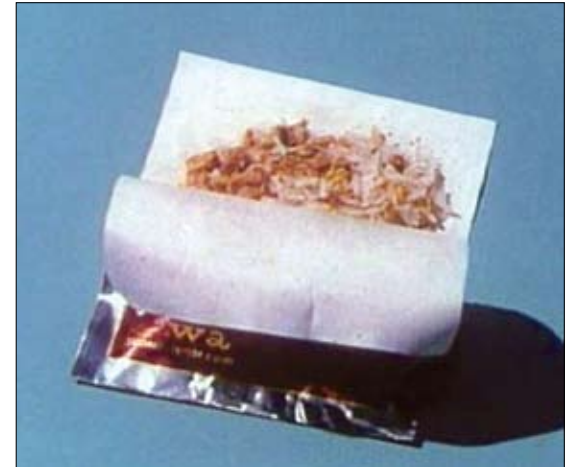
#046->URL[3441] Foldable chairs made of aluminium tubes and nylon appeared in yards and gardens, while drink cans made of bright anodized aluminium were seen on tables. #047->URL[3368] In the USA, about 50% of beer and non-alcohol drinks are stored in aluminium cans. #048->URL[3372] Inside these aluminium cans there is a protective polymeric coat, which prolongs the product's storage life. #049->URL[3456] The aluminium in a drinks can used today could once have been used in Queen Victoria's fork. #050->URL[3456] An average aluminium can (without its contents, of course) weighed 16.55 grams in 1992 in 2001 it weighed just 14.9 gram, 30% lighter than 25 years ago. #051->URL[3363] The aluminium barrier is what plays the essential role, making it possible to transport and store food for long periods without refrigeration. #052->URL[3456] Keeping contents fresh and protecting them from external influences, guarantees the long shelf-life. #053->URL[3366] In addition there is a ready market for used aluminium cans once they have been recovered from the waste stream. #054->URL[3445] In Russia, Alcan sells aluminium products for the tobacco and cosmetics industries.



#055 FILM[Aluminum on the March]->[01:15:51]->KEYWORD[barrier]



#056 FILM[Aluminum on the March]->[01:16:40]->KEYWORD[juice]



#057 FILM[Aluminum on the March]->[01:16:03]->KEYWORD[toxic]



#058 FILM[Aluminum on the March]->[01:10:08]->KEYWORD[beverage]



#059 FILM[Aluminum on the March]->[01:10:31]->KEYWORD[greenhouse]



#060 FILM[Aluminum on the March]->[01:10:56]->KEYWORD[hydroxide]



#061 FILM[Aluminum on the March]->[04:15:00]->KEYWORD[aerosol]

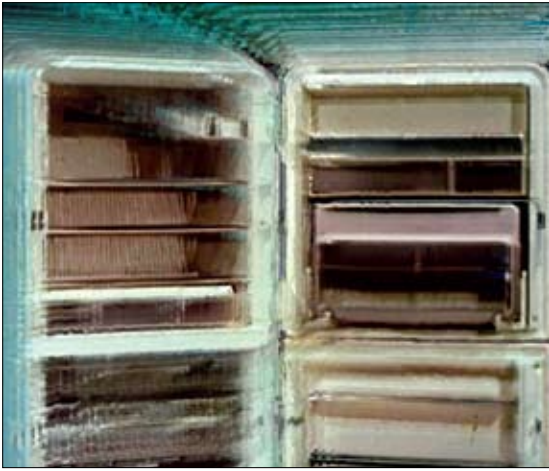


#062 FILM[Aluminum on the March]->[01:26:03]->KEYWORD[products]

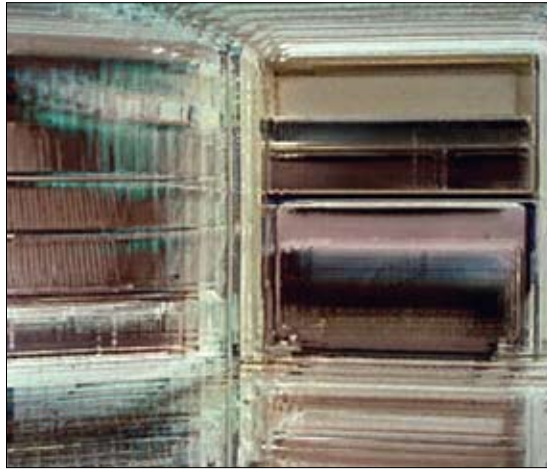


#063 FILM[Aluminum on the March]->[04:15:15]->KEYWORD[demand]

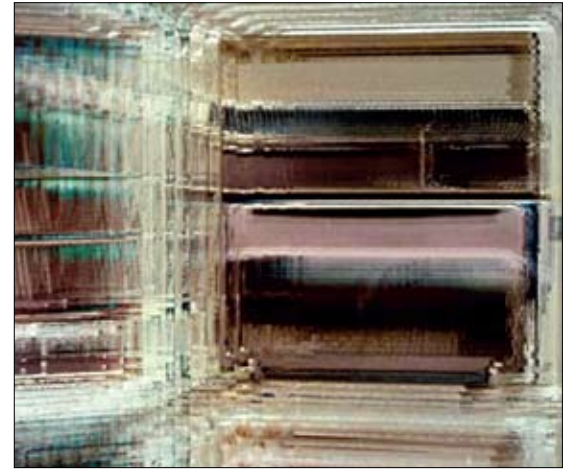
#055->URL[3463] Aluminium thickness of 0.006 mm is sometimes enough to provide the required **barrier**. #056->URL[3460] A 4.8 g flexible fruit **juice** pouch is 33 times lighter than a traditional bottle and the standard 33cl aluminium beverage can now only weighs 14 g or less! #057->URL[3380] When used to package sensitive products such as pharmaceuticals or food, aluminium is hygienic, non-**toxic**, non-tainting and retains the product's flavour. #058->URL[3461] Trban will soon start to collect aluminium **beverage** cans in one of the most populated districts of Bucharest. #059->URL[3460] Use of aluminium products helps limit **greenhouse** gases emissions. #060->URL[3463] Dadco has ownership of aluminium Oxid Stade GMBH, a tolling company that produces aluminium **hydroxide** and alumina. #061->URL[3459] The market share of aluminium cans in the overall European **aerosol** can market accounts for about 40%. #062->URL[3460] About 16% of all aluminium goes into packaging **products**, such as beverage cans, food and aerosol cans, menu trays, tubes, closures and other foil products. #063->URL[3463] The **demand** therefore for recycled aluminium exceeds supply for given products.



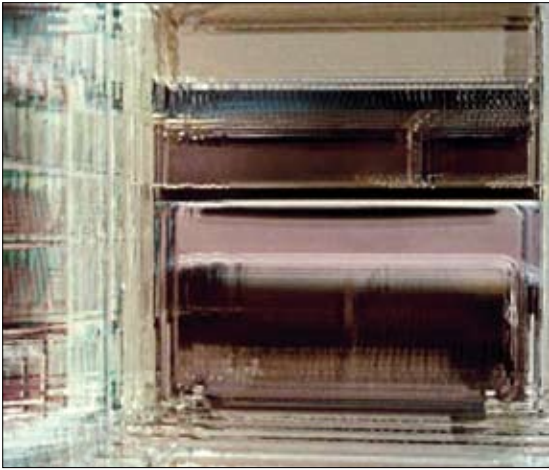
#064 FILM[Aluminum on the March]->[00:02:23]->KEYWORD[aerosol]



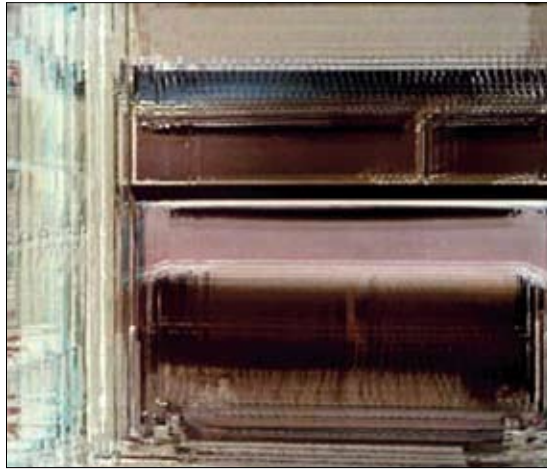
#065 FILM[Aluminum on the March]->[00:01:48]->KEYWORD[beverage]



#066 FILM[Aluminum on the March]->[00:01:32]->KEYWORD[aerosol]



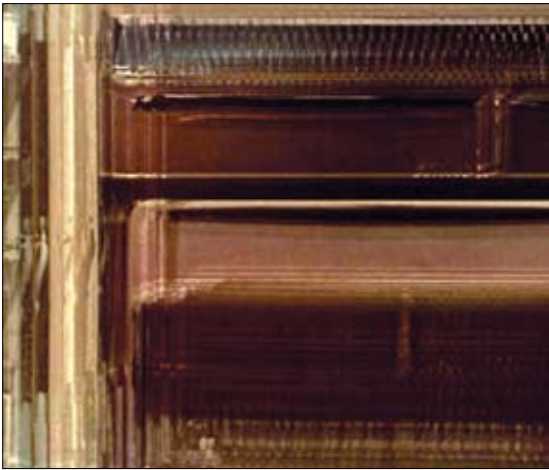
#067 FILM[Aluminum on the March]->[00:01:15]->KEYWORD[recycling]



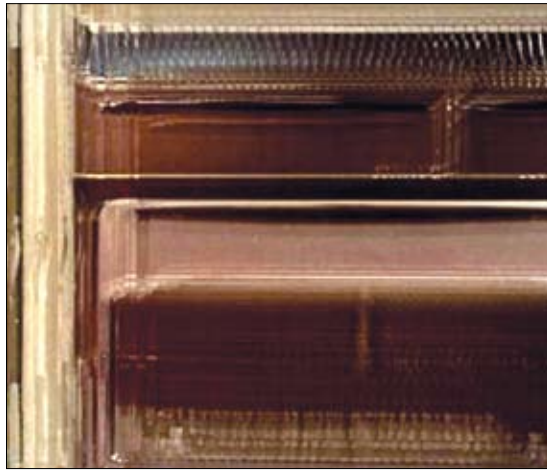
#068 FILM[Aluminum on the March]->[00:01:03]->KEYWORD[life]



#069 FILM[Aluminum on the March]->[00:00:52]->KEYWORD[romanian]



#070 FILM[Aluminum on the March]->[00:00:40]->KEYWORD[polish]



#071 FILM[Aluminum on the March]->[00:00:44]->KEYWORD[packaging]



#072 FILM[Aluminum on the March]->[00:00:36]->KEYWORD[greenhouse]

#064->URL[3462] European production of aluminium aerosol cans hits the 2 billion mark in 2004. #065->URL[3461] Given the increasing sales of aluminium beverage cans and foils. #066->URL[3460] Good prospects for aluminium aerosol cans in 2004, 1.932 billion aluminium aerosol cans were produced in Europe. #067->URL[3460] In Europe aluminium enjoys high recycling rates, ranging from 58% in beverage cans to 85% in building and construction and 95% in transportation. #068->URL[3459] Aluminium offers an almost unlimited life expectancy and evidence of this is all around us. #069->URL[3460] Romanian consumers can bring their used aluminium beverage cans back to the real hypermarket in Bucharest. #070->URL[3460] The Polish aluminium beverage can recycling rate reached an impressive 65% last year, well above targets set by the EU packaging and packaging waste directive. #071->URL[3456] Look, flexible aluminium packaging is normally totally oxidised under waste incineration conditions with 1 kg of incinerated aluminium releasing as much energy as 0.8 litres of fuel oil. #072->URL[3461] Recycling aluminium reduces greenhouse gas emissions by about 95%.



#073 FILM[Aluminum on the March]->[03:21:35]->KEYWORD[oxide]



#074 FILM[Aluminum on the March]->[03:22:39]->KEYWORD[foil]



#075 FILM[Aluminum on the March]->[03:25:36]->KEYWORD[tailored]



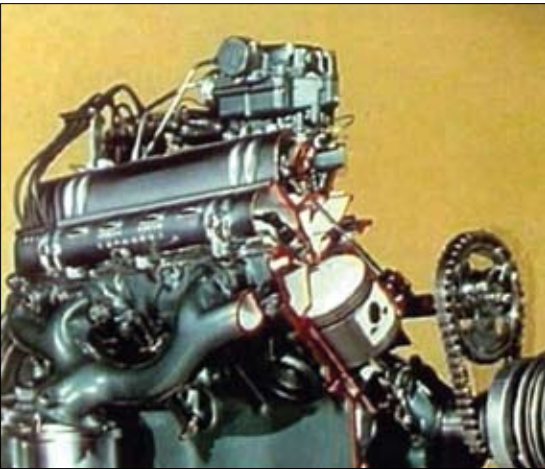
#076 FILM[Aluminum on the March]->[04:18:48]->KEYWORD[tube]



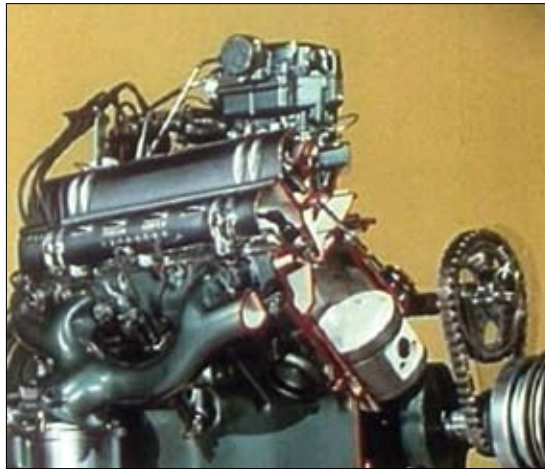
#077 FILM[Aluminum on the March]->[04:18:11]->KEYWORD[smelters]



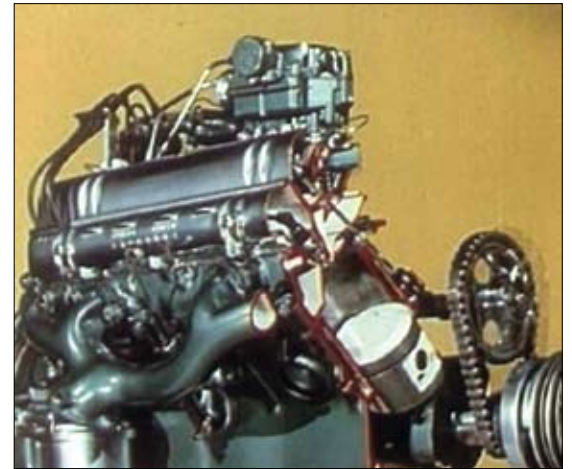
#078 FILM[Aluminum on the March]->[04:18:32]->KEYWORD[optimistic]



#079 FILM[Aluminum on the March]->[04:22:44]->KEYWORD[airbus]



#080 FILM[Aluminum on the March]->[04:23:12]->KEYWORD[remelted]



#081 FILM[Aluminum on the March]->[04:23:27]->KEYWORD[kilogram]

#073->URL[3331] The naturally occurring surface **oxide** on aluminium in the presence of atmospheric oxygen acts as a shield and renders foil corrosion resistant. #074->URL[3334] When fully annealed, aluminium **foil** retains no temper and therefore retains its shape when deformed. #075->URL[3424] For most alufoil packaging, virtually pure aluminium is used but, increasingly, alloys are being '**tailored**' to lend strength. #076->URL[3445] Warren Mearthur was among the first to develop aluminium **tube** furniture. #077->URL[3460] The efficiency of aluminium **smelters** has shown a steady improvement since the 1950s, and electricity consumption has fallen by more than a third. #078->URL[3445] At the start of the 1950s, during the rise of mass consumption, aluminium articles were associated with a new and **optimistic** lifestyle. #079->URL[3460] Although some planes such as the Eurofighter and **Airbus** use carbon fibre composites, it is safe if thick enough and used in conjunction with aluminium. #080->URL[3346] The quality of **remelted** aluminium is as high as the new metal. #081->URL[3378] One kilogram of aluminium can conduct twice as much electricity as one **kilogram** of cuprum.



#082 FILM[Aluminum on the March]->[00:50:20]->KEYWORD[deodorants]



#083 FILM[Aluminum on the March]->[00:50:28]->KEYWORD[aeroplane]



#084 FILM[Aluminum on the March]->[00:50:36]->KEYWORD[packaging]



#085 FILM[Aluminum on the March]->[00:50:44]->KEYWORD[couture]



#086 FILM[Aluminum on the March]->[00:50:39]->KEYWORD[patents]



#087 FILM[Aluminum on the March]->[00:50:52]->KEYWORD[dresses]



#088 FILM[Aluminum on the March]->[00:51:04]->KEYWORD[jewellery]



#089 FILM[Aluminum on the March]->[00:51:07]->KEYWORD[tonne]



#090 FILM[Aluminum on the March]->[00:51:12]->KEYWORD[russia]

#082->URL[3445] Even **deodorants** and anti-perspirants contain aluminium. #083->URL[3378] Even the first aircraft in the world, constructed by Wright brothers in 1903, had a four-cylinder 12 horse power engine enclosed in an 13.5 kg aluminium unit to make the **aeroplane** lighter. #084->URL[3381] Foil is the second most popular type of aluminium **packaging**. #085->URL[3445] However, aluminium is not only used in Haute **couture**, but many women have lurex clothes made of aluminium foil and plastic. #086->URL[3428] He obtained 22 other **patents**, mainly connected with aluminium production. #087->URL[3445] His show in 1999 shone with aluminium disc **dresses**. #088->URL[3445] It is not surprising that aluminium was first used for **jewellery** and other luxury articles. #089->URL[3437] One **tonne** of aluminium is produced from every two tonnes of alumina. #090->URL[3382] Over 25% of aluminium produced in **Russia** is used in electrical equipment.



#091 FILM[Aluminum on the March]->[00:51:20]->KEYWORD[packaging]



#092 FILM[Aluminum on the March]->[00:52:04]->KEYWORD[elegant]



#093 FILM[Aluminum on the March]->[00:52:15]->KEYWORD[pot]



#094 FILM[Aluminum on the March]->[00:52:28]->KEYWORD[foil]



#095 FILM[Aluminum on the March]->[00:52:39]->KEYWORD[foil]



#096 FILM[Aluminum on the March]->[00:53:00]->KEYWORD[kinetic]



#097 FILM[Aluminum on the March]->[00:53:44]->KEYWORD[nepheline]



#098 FILM[Aluminum on the March]->[00:54:23]->KEYWORD[industry]

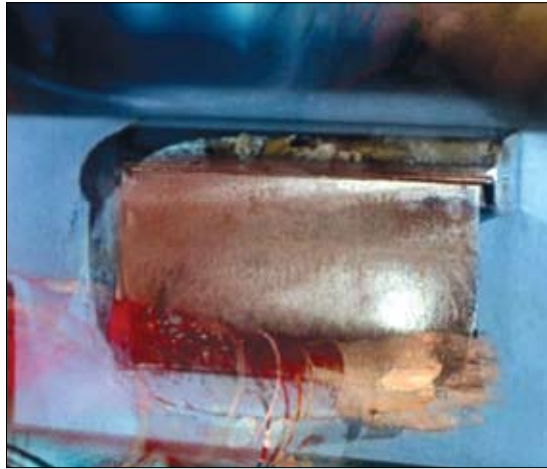


#099 FILM[Aluminum on the March]->[00:54:47]->KEYWORD[chinese]

#091->URL[3445] Aluminium pharmaceuticals, transport electrics, engineering industry **packaging** should be light, solid, unbreakable. #092->URL[3448] Salvatore Ferragamo once created **elegant** bags made from the metal, and Oscar de la Renta made aluminium swimsuits. #093->URL[3433] Starting in 1979 with a single **pot** line, producing only 136,000 MTPA, Dubai today has a production capacity of 900,000 MTPA of aluminium. #094->URL[3445] For example, aluminium walls with insulation and **foil** reflecting coating provide protection which is four times more effective than 10 cm brick coat or 20 cm-thick masonry. #095->URL[3378] So, aluminium **foil** not only meets many ideal packaging requirements, but it can make everyday life easier too. #096->URL[3445] The ability of aluminium to absorb **kinetic** energy is taken into consideration when modern cars are designed. #097->URL[3378] The company incorporates bauxite and **nepheline** ore producers, aluminium, alloys, foil and packaging materials, as well as power assets. #098->URL[3388] The Russian aluminium **industry** is developing rapidly. #099->URL[3356] Founded in 2001 during the privatization of the **Chinese** aluminium industry



#100 FILM[Aluminum on the March]->[00:18:52]->KEYWORD[metallic]



#101 FILM[Aluminum on the March]->[00:18:00]->KEYWORD[pricing]



#102 FILM[Aluminum on the March]->[00:18:36]->KEYWORD[foil]



#103 FILM[Aluminum on the March]->[00:20:56]->KEYWORD[imagine]



#104 FILM[Aluminum on the March]->[00:24:48]->KEYWORD[cheese]



#105 FILM[Aluminum on the March]->[00:20:00]->KEYWORD[military]



#106 FILM[Aluminum on the March]->[00:26:56]->KEYWORD[military]



#107 FILM[Aluminum on the March]->[00:27:15]->KEYWORD[chilled]



#108 FILM[Aluminum on the March]->[00:27:36]->KEYWORD[olympic]

#100->URL[3460] Aluminium never occurs naturally in **metallic** form. #101->URL[3463] I am looking for recent **pricing** trends in the aluminium industry. #102->URL[3361] I want to know more about the production process of aluminium **foil**. #103->URL[3445] It is now impossible to **imagine** power systems and power equipment without aluminium wires as it is also applied for the wiring of engines and transformers. #104->URL[3346] In the supply chain of a soft **cheese**, aluminium foil's contribution to energy consumption is, even if land filled after use less than 10%. #105->URL[3378] The first applications designed and developed for mass production date back to the early post-war period. #106->URL[3413] **Military** applications too, are increasingly turning to aluminium as an alternative to steel. #107->URL[3425] Its light weight provides scope for transport cost-savings and its good thermal conductivity means that aluminium-packed products can be heated or **chilled** quickly and economically. #108->URL[3425] In Sydney 2000, the **Olympic** torch survived the long journey from Greece to Australia thanks to the intensive use of aluminium.



#109 FILM[Aluminum on the March]->[00:31:56]->KEYWORD[foils]



#110 FILM[Aluminum on the March]->[00:29:00]->KEYWORD[tasteless]



#111 FILM[Aluminum on the March]->[00:29:44]->KEYWORD[youth]



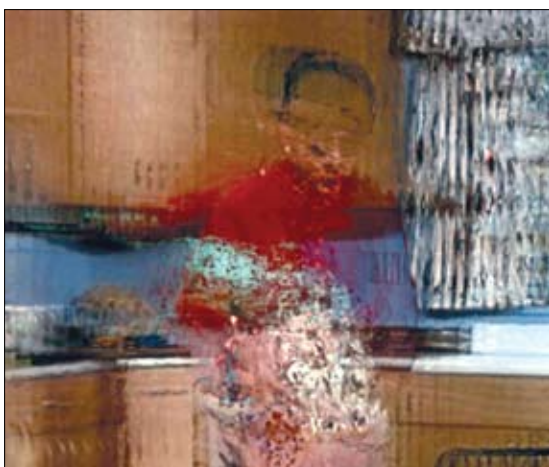
#112 FILM[Aluminum on the March]->[00:28:23]->KEYWORD[nanopowders]



#113 FILM[Aluminum on the March]->[00:34:36]->KEYWORD[foil]



#114 FILM[Aluminum on the March]->[00:32:55]->KEYWORD[incinerator]



#115 FILM[Aluminum on the March]->[00:33:44]->KEYWORD[purification]



#116 FILM[Aluminum on the March]->[00:35:07]->KEYWORD[alloys]



#117 FILM[Aluminum on the March]->[00:35:28]->KEYWORD[dog]

#109->URL[3436] Anodised aluminium foils, present remarkable dielectric properties. #110->URL[3425] On the other hand, the tasteless aluminium barrier will retain liquids and prevent the loss of aroma and other volatile components. #111->URL[3428] Aluminium is an old person, recycling gives it the same effect as the fountain of youth. #112->URL[3436] Mostly polymer matrix compounded with conductive material: e.g. carbon soot, graphite fibres, nickel-coated carbon fibres; steel fibres; aluminium flakes; metal nanopowders. #113->URL[3425] On the one hand, aluminium foil has the ability to protect its contents from damaging environmental influences such as oxygen, light, moisture, micro-organisms and unwanted aromas. #114->URL[3346] In the latter case, aluminium is recovered from incinerator bottom ashes (12,500 tonnes extracted in 2001). #115->URL[3421] Purification thus becomes an important aspect in re-use of aluminium for production. #116->URL[3436] Usually the parts machined for automotive use are composed of aluminium-silicon alloys. #117->URL[3445] Aibo, a well-known Japanese robot dog, is made with aluminium.



#116 FILM[Metal in Harmony 1]->[14:54:27]->KEYWORD[joints]



#119 FILM[Metal in Harmony 1]->[14:55:31]->KEYWORD[aircraft]



#120 FILM[Metal in Harmony 1]->[14:58:20]->KEYWORD[properties]



#121 FILM[Aluminum on the March]->[00:05:24]->KEYWORD[lamps]



#122 FILM[Aluminum on the March]->[00:05:44]->KEYWORD[lighting]



#123 FILM[Aluminum on the March]->[00:07:12]->KEYWORD[used]



#124 FILM[Aluminum on the March]->[00:09:20]->KEYWORD[silvery]



#125 FILM[Aluminum on the March]->[00:09:28]->KEYWORD[goods]



#126 FILM[Aluminum on the March]->[00:09:35]->KEYWORD[sodium]

#116->URL[3417] High strength **joints** with great structural integrity, can be readily made with aluminium by welding, brazing, riveting and by adhesive bonding. #119->URL[3417] In the air, aluminium has been the natural choice for **aircraft** construction for many years. #120->URL[3425] Since aluminium was first commercially produced over 115 years ago, its unique combination of **properties** has enabled designers and manufacturers to develop products that enhance the quality of life. #121->URL[3378] Jacques le Chevallier made several aluminium **lamps**, the most outstanding of which is called Chistera. #122->URL[3446] Aluminium **lighting** fixtures, which have become an important element of modern minimalist interiors, also spring from the pre-war period. #123->URL[3445] A Dane, Jorgen Balthasar Dalhoff **used** aluminium to create ceremonial crowns for the King Frederick VIII and the Prince Ferdinand. #124->URL[3378] Its dome was coated with **silvery** aluminium. #125->URL[3445] Its oxide film makes it resistant to corrosion and this means that the life of aluminium **goods** is very long. #126->URL[3445] He applied cheaper metallic **sodium** in order to displace aluminium.



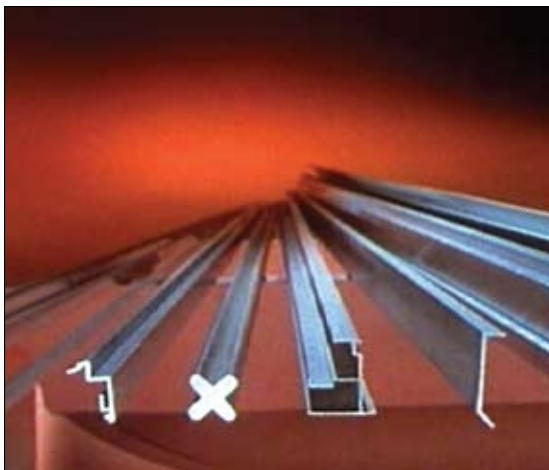
#127 FILM[Aluminum on the March]->[00:10:43]->KEYWORD[burst]



#128 FILM[Aluminum on the March]->[00:11:24]->KEYWORD[research]



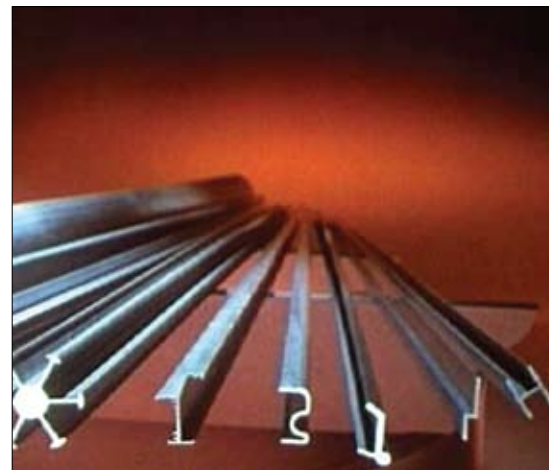
#129 FILM[Aluminum on the March]->[00:12:11]->KEYWORD[diadem]



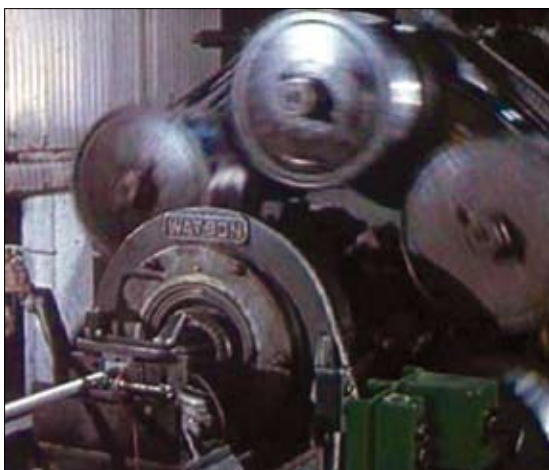
#130 FILM[Aluminum on the March]->[03:02:31]->KEYWORD[bauxites]



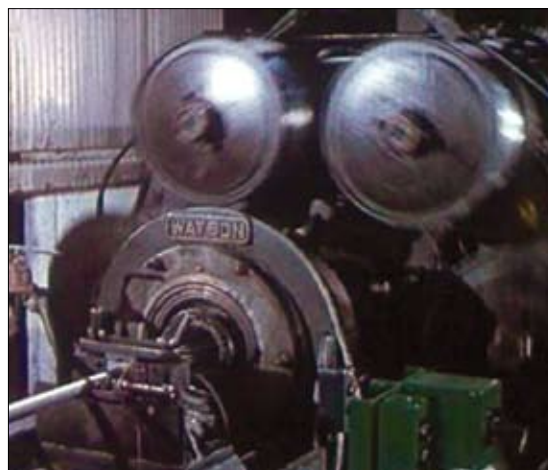
#131 FILM[Aluminum on the March]->[03:03:23]->KEYWORD[french]



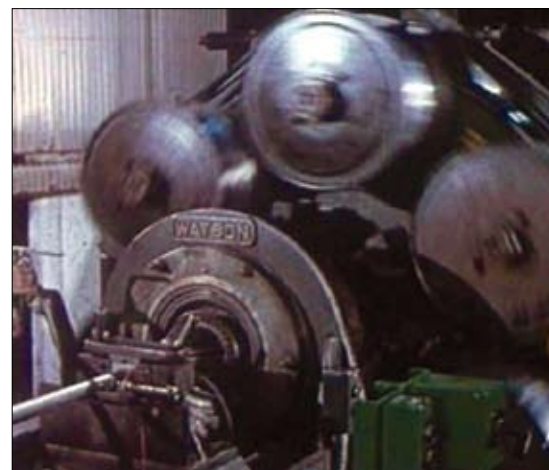
#132 FILM[Aluminum on the March]->[03:06:24]->KEYWORD[smelters]



#133 FILM[Aluminum on the March]->[03:28:28]->KEYWORD[napoleon]



#134 FILM[Aluminum on the March]->[03:28:35]->KEYWORD[named]



#135 FILM[Aluminum on the March]->[03:29:00]->KEYWORD[seized]

#127->URL[3421] Outlook: prices a late cycle **burst** for aluminium. #128->URL[3421] Professor Nisancioglu has 36 years of expertise in aluminium **research** and development activities in Europe. #129->URL[3445] Rene Lalique once made a **diadem**, where aluminium was decorated with ivory and garnets. #130->URL[3445] Rio Tinto aluminium mines **bauxites**, produces alumina and primary aluminium, accounting for 26% of all aluminium, manufactured in Australia. #131->URL[3461] Rio Tinto proposed to take over Alcan, which, in turn, has already taken over the **French** aluminium manufacturer Pechiney. #132->URL[3445] Russian aluminium **smelters** fully comply with the standards of the international market. #133->URL[3364] Emperor **Napoleon III**, at whose table the most honorary guests were served food on aluminium tableware, dreamed of supplying his army with Cuirasses made of this light metal. #134->URL[3378] It was he who **named** the metal aluminium. #135->URL[3445] Its base is made of this universal metal, a role that aluminium **seized** from brass in the 1950s.



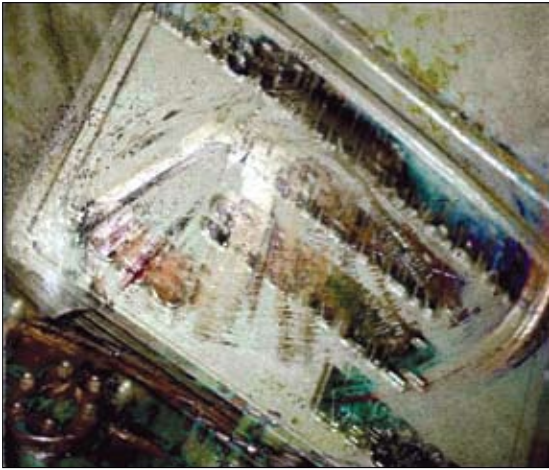
#136 FILM[Metal in Harmony 1]->[05:37:56]->KEYWORD[ships]



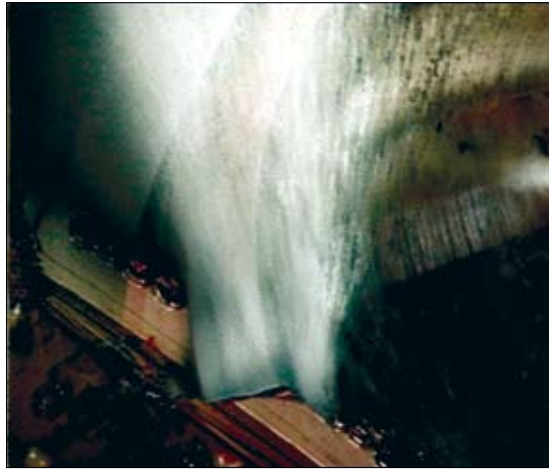
#137 FILM[Metal in Harmony 1]->[05:38:03]->KEYWORD[social]



#138 FILM[Metal in Harmony 1]->[05:39:16]->KEYWORD[remote]



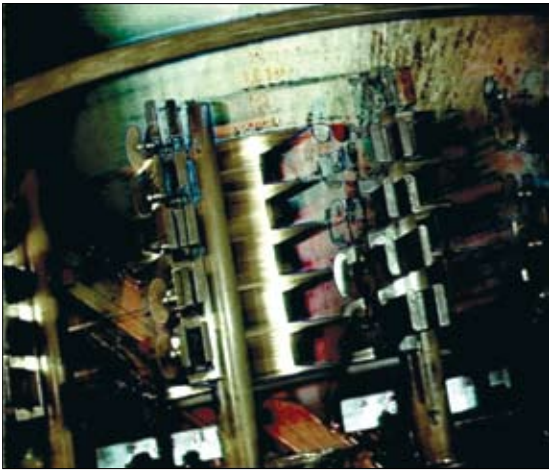
#139 FILM[Metal in Harmony 1]->[05:39:27]->KEYWORD[alumina]



#140 FILM[Metal in Harmony 1]->[05:43:07]->KEYWORD[alumina]



#141 FILM[Metal in Harmony 1]->[05:39:32]->KEYWORD[technical]



#142 FILM[Metal in Harmony 1]->[05:46:19]->KEYWORD[cleaning]



#143 FILM[Metal in Harmony 1]->[05:47:24]->KEYWORD[rarely]

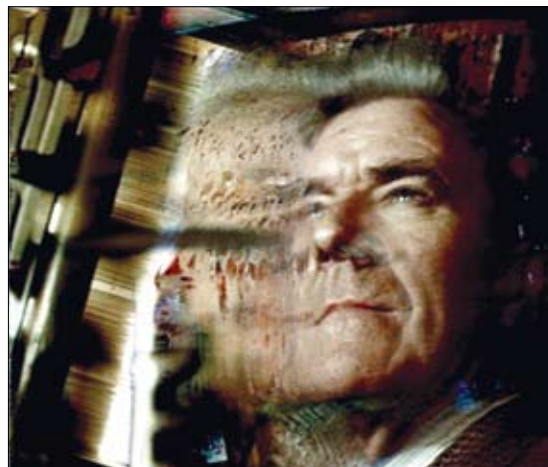


#144 FILM[Metal in Harmony 1]->[05:47:40]->KEYWORD[Modern]

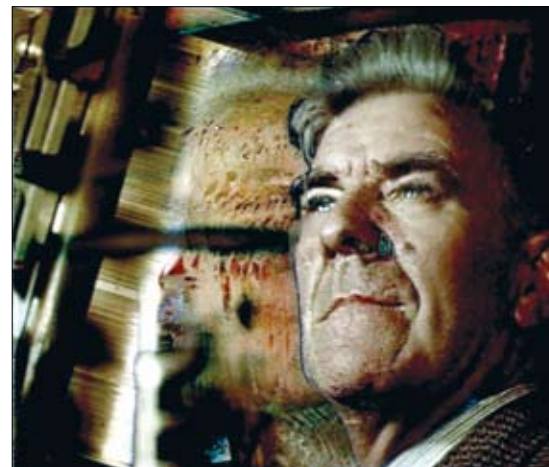
#136->URL[3417] At sea, the use of aluminium for the construction of **ships**, hulls and superstructures, is increasing year by year. #137->URL[3348] The European aluminium industry is conscious that the well-being of future generations depends on how we preserve our **social** and environmental resources. #138->URL[3445] It is for this reason that the most efficient place to construct aluminium smelters is in **remote** regions, where there is free access to power sources. #139->URL[3455] It produces 15% of the world's **alumina** and 12% of its aluminium. #140->URL[3460] On a world-wide average 4 to 5 tonnes of bauxite are needed to produce two tonnes of **alumina**, from which one tonne of aluminium can be produced. #141->URL[3460] On an international level, harmonisation on the material aluminium is discussed within the **technical** committee ISO/TC 79. #142->URL[3371] Low maintenance: besides routine **cleaning** for aesthetic reasons, neither bare nor painted aluminium requires any maintenance. #143->URL[3460] For this reason, used aluminium is **rarely** lost. #144->URL[3458] **Modern** society without aluminium is unthinkable.



#145 FILM[Metal in Harmony 1]->[05:50:52]->KEYWORD[father]



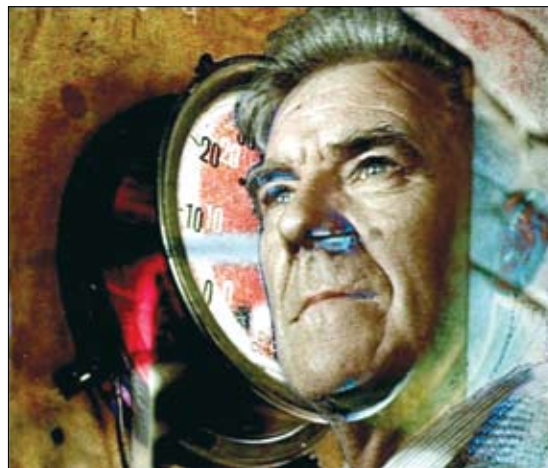
#146 FILM[Metal in Harmony 1]->[05:51:56]->KEYWORD[remote]



#147 FILM[Metal in Harmony 1]->[05:52:12]->KEYWORD[offshore]



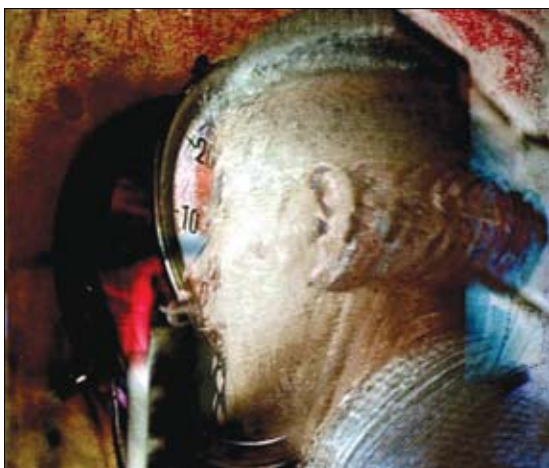
#148 FILM[Metal in Harmony 1]->[05:58:15]->KEYWORD[energy]



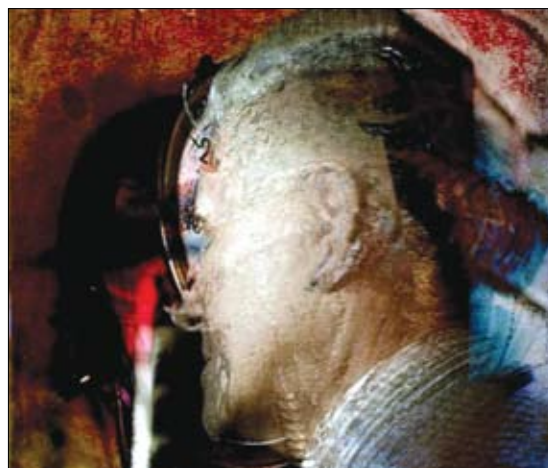
#149 FILM[Metal in Harmony 1]->[05:59:20]->KEYWORD[ductility]



#150 FILM[Metal in Harmony 1]->[05:52:44]->KEYWORD[Lenin]



#151 FILM[Metal in Harmony 1]->[06:00:15]->KEYWORD[Beketov]



#152 FILM[Metal in Harmony 1]->[06:00:19]->KEYWORD[energy]



#153 FILM[Metal in Harmony 1]->[06:00:11]->KEYWORD[energy]

#145->URL[3462] Lomako is known as the **father** of the Russian aluminium industry, smelters in the country were established under his management. #146->URL[3346] Over half of the energy used in the global primary aluminium industry is derived from non-polluting hydropower in regions **remote** from the world's main population centres. #147->URL[3420] Holland and Norway use a high volume of aluminium for **offshore** applications. #148->URL[3346] Primary aluminium is an **energy** intensive process, however specific energy use in the primary aluminium industry has been steadily reduced. #149->URL[3436] Its **ductility** allows products of aluminium to be basically formed close to the end of the products design. #150->URL[3366] Tikhonov's project, the USSR state committee for standards building where aluminium structures were widely used, was constructed on **Lenin** avenue. #151->URL[3348] In 1865, **Beketov** invented a chemical method to produce aluminium. #152->URL[3458] Recycling of used aluminium beverage cans saves up to 95% **energy**. #153->URL[3460] Recycling takes about 5% of the **energy** needed in the primary aluminium process.



#154 FILM[Metal in Harmony 2]->[14:49:12]->KEYWORD[barrier]



#155 FILM[Metal in Harmony 2]->[14:49:55]->KEYWORD[metal]



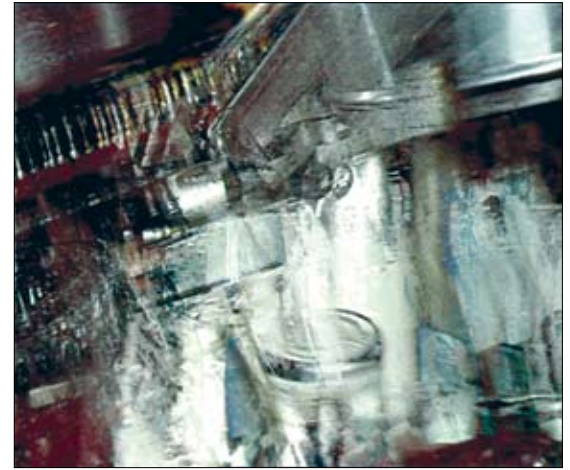
#156 FILM[Metal in Harmony 2]->[14:50:15]->KEYWORD[household]



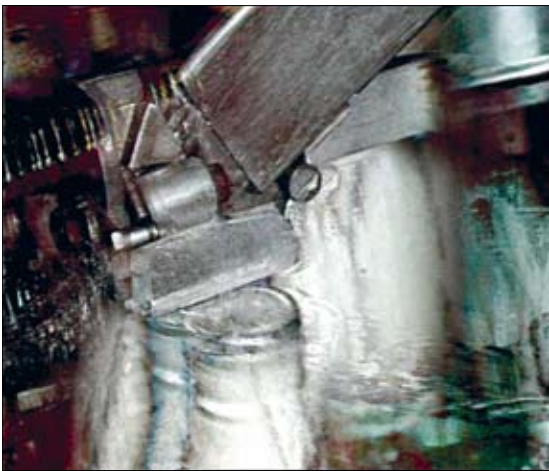
#157 FILM[Metal in Harmony 2]->[14:50:39]->KEYWORD[process]



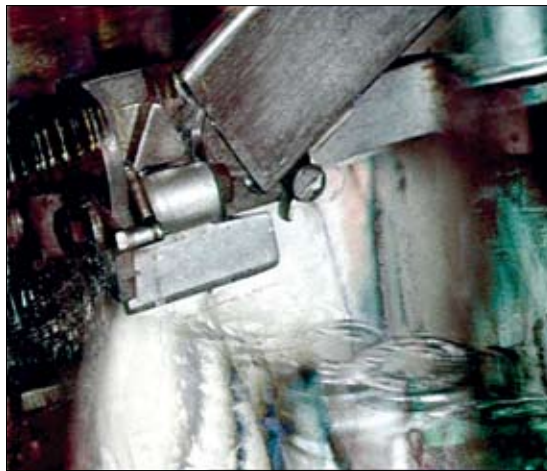
#158 FILM[Metal in Harmony 2]->[14:50:59]->KEYWORD[iconic]



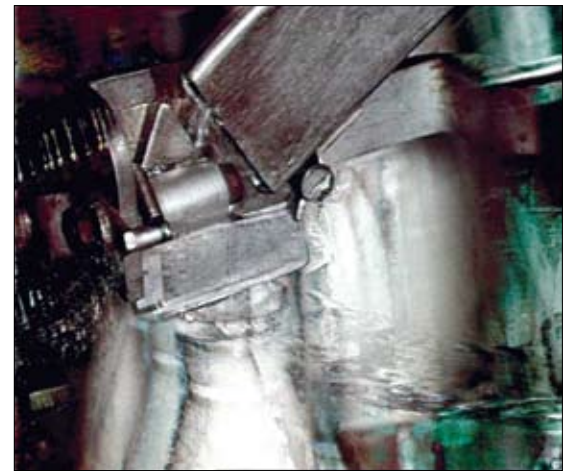
#159 FILM[Metal in Harmony 2]->[14:51:39]->KEYWORD[market]



#160 FILM[Metal in Harmony 2]->[14:52:00]->KEYWORD[scrap]



#161 FILM[Metal in Harmony 2]->[14:52:12]->KEYWORD[skin]



#162 FILM[Metal in Harmony 2]->[14:52:23]->KEYWORD[scrap]

#154->URL[3346] The exceptional **barrier** properties of aluminium make it possible to transport and store food for long periods. #155->URL[3421] Recycling is a major consideration in the continued use of aluminium, representing one of the key attributes of this ubiquitous **metal**. #156->URL[3424] Aluminium foil in **household** waste can be extracted and recycled. #157->URL[3436] In this section the **process** used to create the hydrophilic properties of aluminium are introduced. #158->URL[3460] Made of elegant cast aluminium, it became an **iconic** symbol of the city and is now one of its best loved attractions. #159->URL[3460] Market mechanisms: the European aluminium industry supports setting-up of approaches based on **market** mechanisms. #160->URL[3357] New **scrap** is the surplus material that is discarded during the fabrication and manufacturing of aluminium alloys (e.g. the splinters of sheet edge trimmings). #161->URL[3460] Now that the Atomium is undergoing renovation, the original aluminium **skin** is about to serve new purposes. #162->URL[3462] Old **scrap** is an aluminium material that is collected after an aluminium containing product has reached the end of its useful life.



#163 FILM[Metal in Harmony 1]->[00:04:03]->KEYWORD[alloys]



#164 FILM[Metal in Harmony 1]->[00:04:12]->KEYWORD[clad]



#165 FILM[Metal in Harmony 1]->[00:04:19]->KEYWORD[alcoa]



#166 FILM[Aluminum on the March]->[00:53:04]->KEYWORD[leaders]



#167 FILM[Aluminum on the March]->[00:53:07]->KEYWORD[jamaica]



#168 FILM[Aluminum on the March]->[00:53:12]->KEYWORD[smelters]



#169 FILM[Metal in Harmony 1]->[00:22:19]->KEYWORD[recycling]



#170 FILM[Metal in Harmony 1]->[00:22:56]->KEYWORD[scrap]

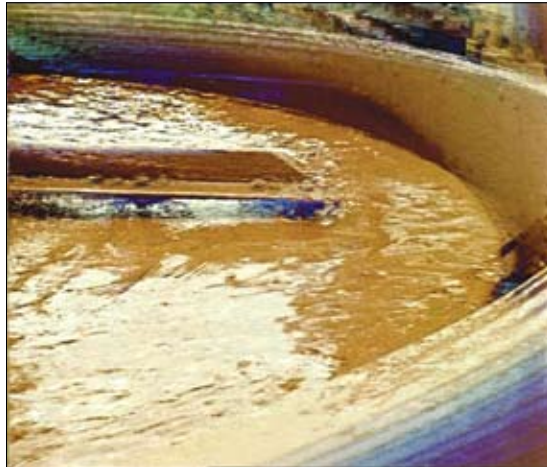


#171 FILM[Metal in Harmony 1]->[00:23:44]->KEYWORD[mining]

#163->URL[3417] The majority of these alloys consist of aluminium with carefully controlled additions of copper, magnesium, silicon, manganese, zinc and more recently lithium. #164->URL[3436] Steel clad with aluminium has good EMS properties. #165->URL[3445] Alcoa is one of the world's leading manufacturers of primary aluminium, aluminium products and alumina. #166->URL[3445] Only those who can establish and manage the full production cycle in a highly efficient way can become leaders in the aluminium industry. #167->URL[3451] Hydro aluminium is a downstream-integrated company with major alumina assets in Brazil and Jamaica, and aluminium smelters in Australia, Canada, Germany, Norway and Slovakia. #168->URL[3435] It controls or holds shares of several aluminium smelters in the US and Iceland, as well as a number of mining assets in Jamaica and in the USA. #169->URL[3458] Increased recycling through improved aluminium collection. #170->URL[3460] Indeed, aluminium scrap can be repeatedly recycled without any loss of value or properties. #171->URL[3460] Bauxite mining: the mining of bauxite is the first step in aluminium production.



#172 FILM[Metal in Harmony 1]->[00:52:55]->KEYWORD[alumina]



#173 FILM[Metal in Harmony 1]->[00:53:52]->KEYWORD[innovation]



#174 FILM[Metal in Harmony 1]->[00:54:20]->KEYWORD[oxide]



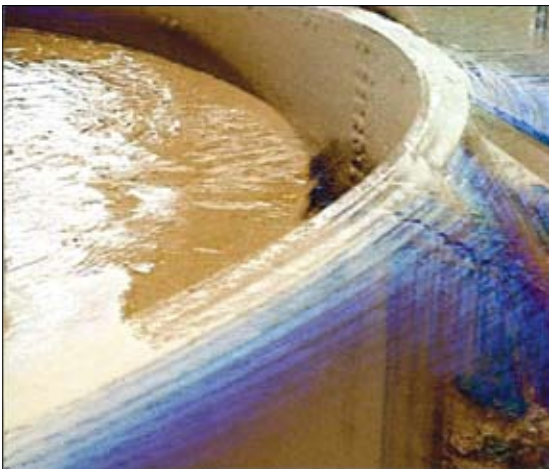
#175 FILM[Metal in Harmony 1]->[00:52:12]->KEYWORD[alcoa]



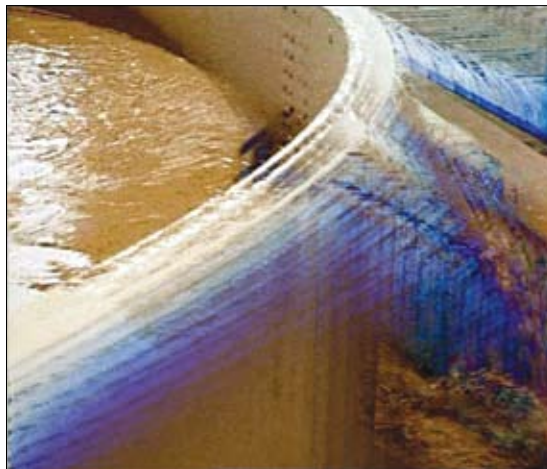
#176 FILM[Metal in Harmony 1]->[00:50:28]->KEYWORD[heroult]



#177 FILM[Metal in Harmony 1]->[00:51:12]->KEYWORD[mud]



#178 FILM[Metal in Harmony 1]->[00:54:44]->KEYWORD[alloy]



#179 FILM[Metal in Harmony 1]->[00:55:04]->KEYWORD[clad]



#180 FILM[Metal in Harmony 1]->[00:57:31]->KEYWORD[mud]

#172->URL[3424] The ore is refined to make 'alumina', a pure aluminium oxide. #173->URL[3430] Every company that has an aluminium innovation can take part. #174->URL[3442] Alumina or aluminium oxide, is produced from extracted ore. Despite its name, it has nothing to do with clay or black soil but resembles a flour or very white sand. #175->URL[3445] Aluminium news 20 June London, Dow Jones Alcoa: sold 10% stake in Ghana's Valco smelter. #176->URL[3446] Heroult invented a method for industrial aluminium production through the electrolysis of alumina molten in cryolite in 1886, the same year as Charles Hall. #177->URL[3445] The main waste generated during the aluminium production cycle, is during alumina production and is called red mud, a thick suspension of water-insoluble silicates, aluminium silicates and metal oxides. #178->URL[3458] How to number and write an aluminium alloy correctly, e.g. en aw-6060? #179->URL[3460] In 1898, the dome of San Gioacchino's church in Rome was clad in aluminium sheets, which are still in pristine condition today. #180->URL[3441] Producing one tonne of aluminium oxide in turn produces 360 800 kg of mud.



#181 FILM[Metal in Harmony 1]->[01:00:19]->KEYWORD[primary]



#182 FILM[Metal in Harmony 1]->[01:01:08]->KEYWORD[primary]



#183 FILM[Metal in Harmony 1]->[01:01:23]->KEYWORD[wealthy]



#184 FILM[Metal in Harmony 1]->[00:31:52]->KEYWORD[african]



#185 FILM[Metal in Harmony 1]->[00:32:00]->KEYWORD[bauxites]



#186 FILM[Metal in Harmony 1]->[00:32:47]->KEYWORD[tonnes]



#187 FILM[Metal in Harmony 1]->[01:02:36]->KEYWORD[bauxite]



#188 FILM[Metal in Harmony 1]->[01:03:20]->KEYWORD[seal]



#189 FILM[Metal in Harmony 1]->[01:02:11]->KEYWORD[owns]

#181->URL[3424] Some 26 million tons of **primary** aluminium are now produced annually around the world. #182->URL[3425] Western Europe accounts for approximately one quarter of **primary** aluminium use. #183->URL[3435] Consumers are **wealthy**, profitability is evident: it seems a lot of companies should be rushing to enter the aluminium sector. #184->URL[3445] It is interesting that not only professional designers from industrial countries, but also **African** craftsmen choose aluminium. #185->URL[3437] The main deposits of high-quality **bauxites** with high aluminium content (not less than 50%), are already divided by the main players. #186->URL[3460] In 1998, world-wide production of primary aluminium was about 22.7 million **tonnes** per year. #187->URL[3460] Four tonnes of **bauxite** are required to produce two tonnes of alumina which in turn produces one tonne of aluminium at the primary smelter. #188->URL[3456] See Corus Crown Cork **Seal** Bevcna Europa European aluminium association for information on aluminium. #189->URL[3445] Whoever owns resources **owns** the world. Resources of bauxites, the raw material for aluminium, are not widespread throughout the world.



#190 FILM[Metal in Harmony 1]->[02:57:55]->KEYWORD[deodorants]



#191 FILM[Metal in Harmony 1]->[03:01:48]->KEYWORD[organic]



#192 FILM[Metal in Harmony 1]->[03:02:04]->KEYWORD[olympic]



#193 FILM[Metal in Harmony 1]->[03:02:11]->KEYWORD[defense]



#194 FILM[Metal in Harmony 1]->[03:02:24]->KEYWORD[coffee]



#195 FILM[Metal in Harmony 1]->[03:02:36]->KEYWORD[mantra]



#196 FILM[Metal in Harmony 1]->[03:02:51]->KEYWORD[employs]



#197 FILM[Metal in Harmony 1]->[03:03:07]->KEYWORD[vehicle]

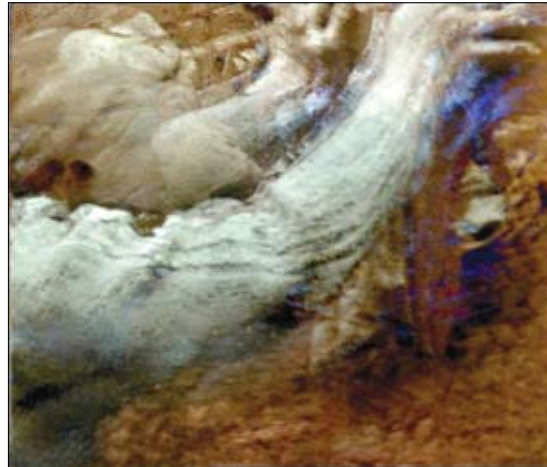


#198 FILM[Metal in Harmony 1]->[03:03:11]->KEYWORD[tablets]

#190->URL[3438] The first anti-perspirants and **deodorants** contained aluminium chloride, and the main agent in modern products is aluminium hydrochloride. #191->URL[3436] Several solutions have been developed to improve adhesion of coatings and **organic** films on aluminium. #192->URL[3425] The **Olympic** games is the arena in which aluminium can shine. #193->URL[3445] During the war, aluminium was used in the **defense** industry as it ended, it again became part of everyday life. #194->URL[3374] These include the la cupola **coffee** machine by Aldo Rossi, the hot Bertaa tea-pot by Philippe Starck, the Lockheed lounge sofa by Mark Newsom. #195->URL[3374] These words became a **mantra** repeated during discussions about aluminium in the construction sector. #196->URL[3448] The European aluminium industry directly **employs** about 236,000 people. #197->URL[3448] Ms Bertram presented studies demonstrating aluminium's capacity to reduce weight in **vehicle** applications. #198->URL[3460] Ancient middle eastern civilisations used aluminium salts for the preparation of dyes and medicines: they are used to this day in indigestion **tablets** and toothpaste.



#199 FILM[Metal in Harmony 1]->[03:03:23]->KEYWORD[recycled]



#200 FILM[Metal in Harmony 1]->[03:03:39]->KEYWORD[buying]



#201 FILM[Metal in Harmony 1]->[03:04:11]->KEYWORD[gold]



#202 FILM[Metal in Harmony 1]->[03:05:11]->KEYWORD[Russian]



#203 FILM[Metal in Harmony 1]->[03:06:11]->KEYWORD[recycling]



#204 FILM[Metal in Harmony 1]->[03:08:11]->KEYWORD[bauxite]



#205 FILM[Metal in Harmony 1]->[03:07:39]->KEYWORD[riveted]



#206 FILM[Metal in Harmony 1]->[03:10:11]->KEYWORD[yarrow]



#207 FILM[Metal in Harmony 1]->[03:14:16]->KEYWORD[barrier]

#199->URL[3460] In 2003, total recycled aluminium increased 4.3% compared to the previous year. #200->URL[3463] We are interested in buying or selling aluminium. #201->URL[3445] Before an industrial method for aluminium production was discovered, it was so rare and precious that there was a time when it was more expensive than gold. #202->URL[3445] During the restructuring of the Russian economy, aluminium industry facilities constructed in soviet times remained operational. #203->URL[3461] In Europe 40% of the 13.2 million tonnes of aluminium used in 2006 came from recycling. #204->URL[3460] In Europe, usually the average bauxite consumption is 4.1 tonnes per tonne of aluminium. #205->URL[3463] In addition, aluminium can be sawed, drilled, riveted, screwed, bent, welded and soldered in the workshop or on the building site. #206->URL[3380] In fact the construction of a vessel in aluminium by Scottish shipbuilders Yarrow Co dates back to 1895. #207->URL[3379] Furthermore, aluminium is also by far the lightest 'complete barrier' packaging material.



#208 FILM[Metal in Harmony 1]->[03:14:40]->KEYWORD[recycled]



#209 FILM[Metal in Harmony 1]->[03:19:07]->KEYWORD[smelter]



#210 FILM[Metal in Harmony 1]->[03:20:52]->KEYWORD[car]



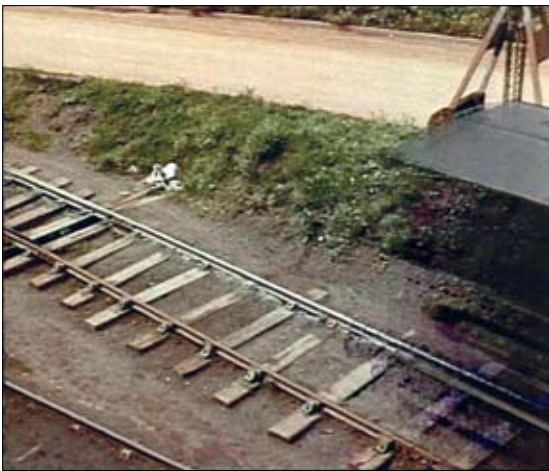
#211 FILM[Metal in Harmony 1]->[03:35:35]->KEYWORD[railway]



#212 FILM[Metal in Harmony 1]->[03:37:35]->KEYWORD[freight]



#213 FILM[Metal in Harmony 1]->[03:38:16]->KEYWORD[barrier]



#214 FILM[Metal in Harmony 1]->[03:39:39]->KEYWORD[trucks]



#215 FILM[Metal in Harmony 1]->[03:40:48]->KEYWORD[beverage]



#216 FILM[Metal in Harmony 1]->[03:41:56]->KEYWORD[situation]

#208->URL[3454] Used aluminium is valuable, it is easily and endlessly recycled without quality loss. #209->URL[3372] Aluminium Bahrain became the largest modern aluminium smelter in the world when it was commissioned in May 2005. #210->URL[3453] Aside from passenger railway cars, freight cars have been made from aluminium for a long time, with the first car being manufactured in 1931. #211->URL[3445] For these reasons, for railway manufacturers, aluminium is certainly a material of the future. #212->URL[3347] In the 1960s, aluminium was used in the manufacturing of box freight cars with a capacity of about 100 tonnes. #213->URL[3383] Where laminates are involved, even the smallest aluminium thickness of 0.006 mm is sometimes enough to provide the required barrier properties. #214->URL[3460] Whether used for the manufacture of trucks, trailers or buses, aluminium cuts down weight and brings substantial savings. #215->URL[3376] With non-registered collection activities taken into account today at least 2 out of 3 aluminium beverage cans are collected and recycled. #216->URL[3376] Yet, we are not aware of any such situation on aluminium material standards.



#217 FILM[Metal in Harmony 1]->[03:42:16]->KEYWORD[trains]



#218 FILM[Metal in Harmony 1]->[03:43:11]->KEYWORD[rail]



#219 FILM[Metal in Harmony 1]->[03:44:00]->KEYWORD[goblets]



#220 FILM[Metal in Harmony 1]->[03:44:48]->KEYWORD[grids]



#221 FILM[Metal in Harmony 1]->[03:45:27]->KEYWORD[power]



#222 FILM[Metal in Harmony 1]->[03:46:04]->KEYWORD[liquid]



#223 FILM[Metal in Harmony 1]->[03:49:07]->KEYWORD[iron]



#224 FILM[Metal in Harmony 1]->[03:52:48]->KEYWORD[bond]



#225 FILM[Metal in Harmony 1]->[03:55:39]->KEYWORD[hydrofoils]

#217->URL[3460] For the high speed **trains**, the choice of aluminium proved to be almost a must. #218->URL[3417] Passenger coaches for **rail** transport are now virtually all aluminium in construction. #219->URL[3445] From 1855-1860, he worked at the court of Napoleon III and created, in particular, an aluminium rattle for the crown prince and several ornate **goblets** and bracelets. #220->URL[3339] In addition, decorative **grids** and reinforcements were made of aluminium. #221->URL[3423] In addition, there are huge **power** savings: melting and production of secondary aluminium consumes only 5% of the power. #222->URL[3435] A thin layer of aluminium foil, which is sometimes only 6.35 microns thick provides full protection from light and **liquid**. #223->URL[3417] In addition, transport manufacturers now try as much as possible to replace traditional **iron** and steel with aluminium. #224->URL[3460] In autumn 1999, when the new James **Bond** movie The World Is Not Enough called for a special money case for 007, there was only one choice a suitcase made from aluminium. #225->URL[3458] The first important structural applications of aluminium were found in passenger **hydrofoils**.



#226 FILM[Metal in Harmony 1]->[06:33:23]->KEYWORD[bears]



#227 FILM[Metal in Harmony 1]->[06:36:36]->KEYWORD[china]



#228 FILM[Metal in Harmony 1]->[06:37:23]->KEYWORD[common]



#229 FILM[Metal in Harmony 1]->[06:48:48]->KEYWORD[modern]



#230 FILM[Metal in Harmony 1]->[06:48:23]->KEYWORD[cutlery]



#231 FILM[Metal in Harmony 1]->[06:49:23]->KEYWORD[european]



#232 FILM[Metal in Harmony 1]->[06:47:40]->KEYWORD[skin]

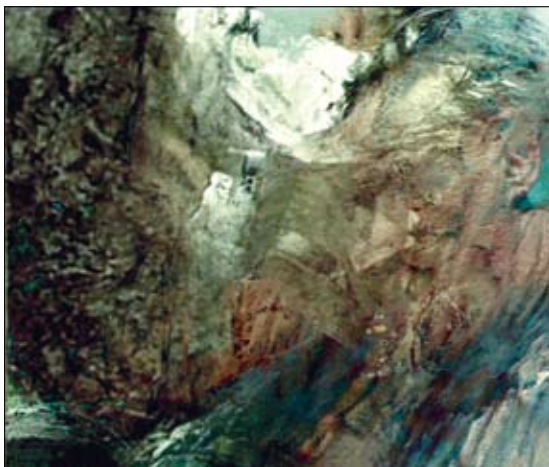


#233 FILM[Metal in Harmony 1]->[06:47:52]->KEYWORD[packaging]



#234 FILM[Metal in Harmony 1]->[06:47:59]->KEYWORD[smelters]

#226->URL[3425] Their excellent condition **bears** witness to the fact that aluminium does not age and needs no protection from ultraviolet light. #227->URL[3438] According to analysts these factors will combine to see **China** consume 36% of world's aluminium production as early as 2010. #228->URL[3442] After the war aluminium became more and more **common**. #229->URL[3445] Modern designers have created aluminium products which have also become cult objects and have been shown at the **modern** art exhibitions. #230->URL[3459] Aluminium was such a valuable commodity that rulers and the wealthy preferred impressing their guests with plates and **cutlery** made from aluminium rather than gold. #231->URL[3460] About 40 percent of **European** aluminium demand is satisfied by recycled material. #232->URL[3450] If the lightning goes in the front of the plane, it then travels along the outer aluminium **skin** and exits the other end, he says. #233->URL[3451] Alupro is the aluminium **packaging** recycling organisation. #234->URL[3445] Over 80% of the aluminium produced by Russian **smelters** is exported.



#235 FILM[Metal in Harmony 1]->[06:49:36]->KEYWORD[antacids]



#236 FILM[Metal in Harmony 1]->[06:49:48]->KEYWORD[principle]



#237 FILM[Metal in Harmony 1]->[06:49:52]->KEYWORD[complex]



#238 FILM[Metal in Harmony 1]->[06:43:27]->KEYWORD[metal]



#239 FILM[Metal in Harmony 1]->[06:43:51]->KEYWORD[prospered]



#240 FILM[Metal in Harmony 1]->[06:45:23]->KEYWORD[jewellery]



#241 FILM[Metal in Harmony 1]->[06:49:56]->KEYWORD[primary]



#242 FILM[Metal in Harmony 1]->[06:49:59]->KEYWORD[bauxite]



#243 FILM[Metal in Harmony 1]->[06:50:19]->KEYWORD[russia]

#235->URL[3443] The most effective **antacids** are based on aluminium. #236->URL[3425] This is the basic **principle** behind the sustainable development indicator exercise of the European aluminium industry. #237->URL[3436] The aluminium surface is a **complex** transition zone between the bulk of the alloy and the environment. #238->URL[3395] The process was subsequently used in commercial aluminium production and the price of the **metal** quickly fell to one-hundredth of its former price. #239->URL[3368] Between 1855 and 1900 many aluminium manufacturing businesses were established, most **prospered** briefly and rapidly waned. #240->URL[3445] Since the 1930s, designers in Benin, Kenya, and Ghana started to make not only aluminium **jewellery** but furniture as well. #241->URL[3460] In 1970 the production of **primary** aluminium amounted to 2.4 million tonnes. #242->URL[3445] Reprocessing 1 kilogram of aluminium saves 8 kilograms of **bauxite**. #243->URL[3451] Since 2007, **Russia** has been the motherland of the largest aluminium company in the world.



#244 FILM[Metal in Harmony 1]->[06:56:48]->KEYWORD[flagship]



#245 FILM[Metal in Harmony 1]->[07:00:11]->KEYWORD[electrical]



#246 FILM[Metal in Harmony 1]->[07:05:15]->KEYWORD[emissions]



#247 FILM[Metal in Harmony 1]->[07:07:03]->KEYWORD[material]



#248 FILM[Metal in Harmony 1]->[07:10:51]->KEYWORD[1808]



#249 FILM[Metal in Harmony 1]->[07:18:11]->KEYWORD[1825]



#250 FILM[Metal in Harmony 1]->[07:19:48]->KEYWORD[1856]



#251 FILM[Metal in Harmony 1]->[07:35:12]->KEYWORD[deville]



#252 FILM[Metal in Harmony 1]->[07:36:23]->KEYWORD[material]

#244->URL[3407] Welcome to Dubai, Dubai's industrial **flagship** and the largest single site aluminium smelter in the western world. #245->URL[3436] Long-distance overhead conductors use aluminium in preference to copper the lower **electrical** conductivity being more than compensated by the lower density and cost. #246->URL[3445] **Emissions** from aluminium production are not connected with the production itself, but with the necessary power generation from fossil fuels. #247->URL[3436] This has made aluminium the most commonly used **material** in major power transmission lines. #248->URL[3445] In **1808**, Humphry Davy, an Englishman, tried to extract aluminium through electrolysis. #249->URL[3445] In **1825**, Rsted produced the first metallic aluminium. #250->URL[3445] In **1856**, he applied electrolysis to molten sodium-aluminium chloride to produce aluminium. #251->URL[3448] He greatly supported **Deville** and later constructed several aluminium smelters. #252->URL[3353] In 1926, aluminium was chosen as a **material** in the construction of the united church in Pittsburgh designed by Henry Hornbostel.



#253 FILM[Metal in Harmony 1]->[07:55:03]->KEYWORD[cubic]



#254 FILM[Metal in Harmony 1]->[07:56:15]->KEYWORD[consume]



#255 FILM[Metal in Harmony 1]->[07:57:04]->KEYWORD[element]



#256 FILM[Metal in Harmony 1]->[07:57:27]->KEYWORD[popular]



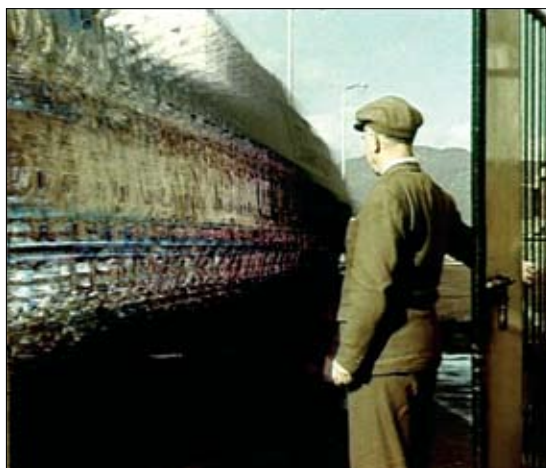
#257 FILM[Metal in Harmony 1]->[07:57:51]->KEYWORD[cheaper]



#258 FILM[Metal in Harmony 1]->[07:58:15]->KEYWORD[luxury]



#259 FILM[Metal in Harmony 1]->[07:58:40]->KEYWORD[designs]



#260 FILM[Metal in Harmony 1]->[07:59:04]->KEYWORD[1957]



#261 FILM[Metal in Harmony 1]->[08:00:39]->KEYWORD[cans]

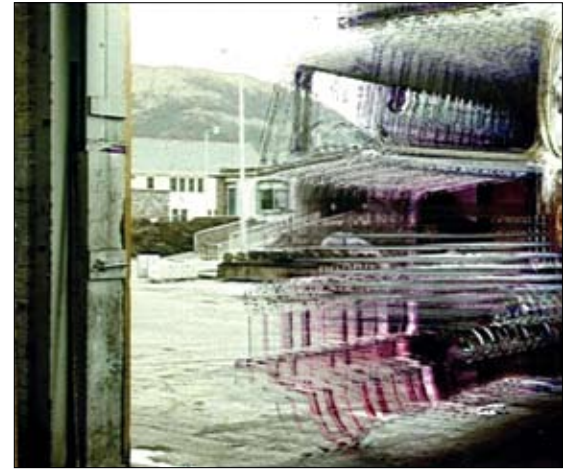
#253->URL[3436] Pure aluminium has a face centred **cubic** crystal structure. #254->URL[3445] Automobile manufacturers also **consume** much of the world's aluminium. #255->URL[3436] The atomic number of aluminium is 13; the **element** is in group 3 of the periodic table. #256->URL[3445] Contrary to **popular** opinion, aluminium mines do not exist. #257->URL[3445] A **cheaper** method to produce aluminium appeared only at the end of the 19th century. #258->URL[3445] Only jewellery and **luxury** articles were made from aluminium at that time. #259->URL[3445] The Alumair building has become one of the best examples of the link between new **designs** and the opportunities of the aluminium industry. #260->URL[3445] The cover of the first satellite launched in **1957** was made of aluminium, and this metal has become irreplaceable for discoveries of the future. #261->URL[3463] Today, aluminium **cans** are about 30% lighter than they were 25 years ago.



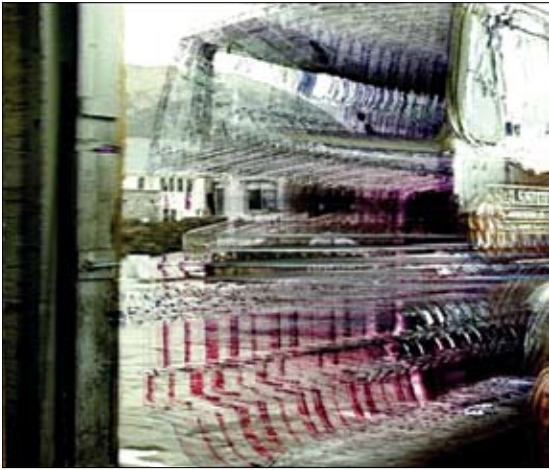
#262 FILM[Metal in Harmony 1]->[08:02:52]->KEYWORD[india]



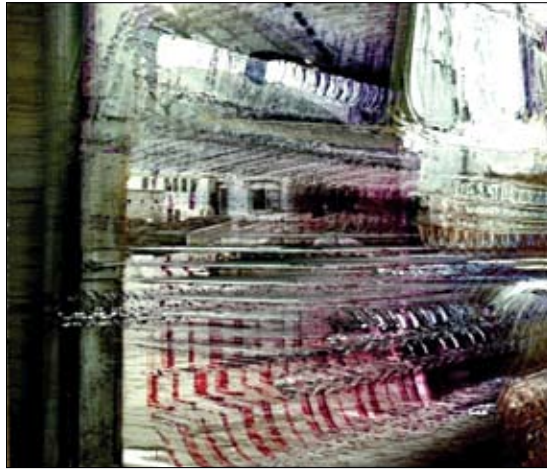
#263 FILM[Metal in Harmony 1]->[08:03:15]->KEYWORD[body]



#264 FILM[Metal in Harmony 1]->[08:03:40]->KEYWORD[plasma]



#265 FILM[Metal in Harmony 1]->[08:04:16]->KEYWORD[car]



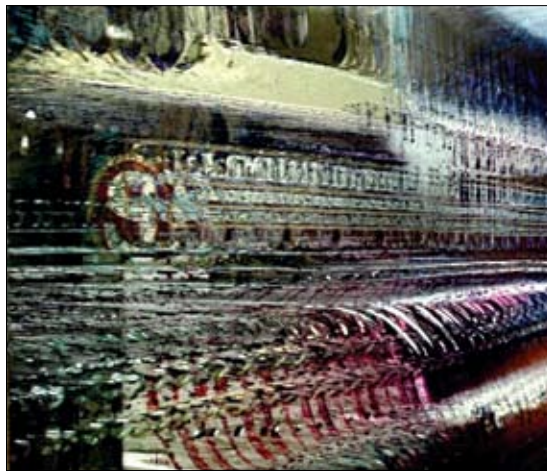
#266 FILM[Metal in Harmony 1]->[08:04:39]->KEYWORD[alcoa]



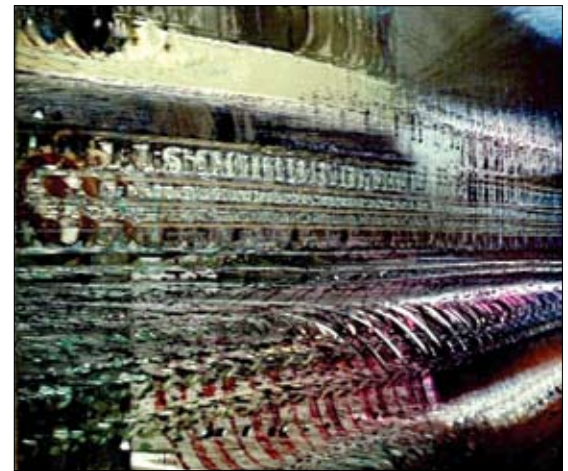
#267 FILM[Metal in Harmony 1]->[08:05:15]->KEYWORD[russian]



#268 FILM[Metal in Harmony 1]->[08:05:40]->KEYWORD[aeroplane]

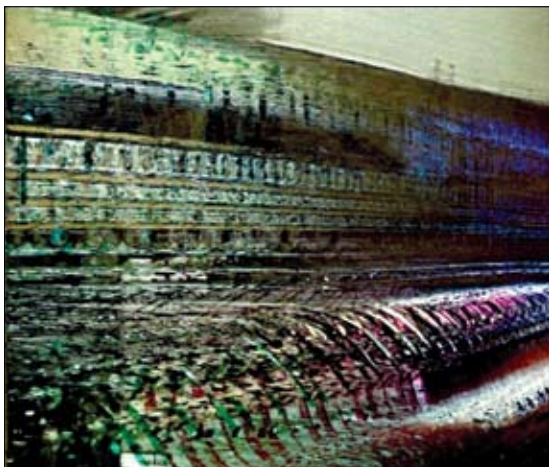


#269 FILM[Metal in Harmony 1]->[08:05:51]->KEYWORD[ships]

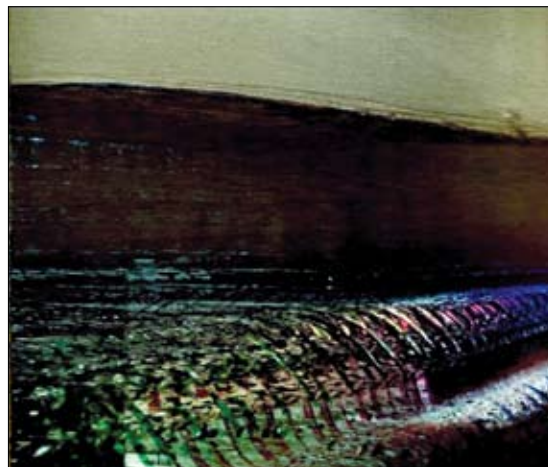


#270 FILM[Metal in Harmony 1]->[08:06:03]->KEYWORD[people]

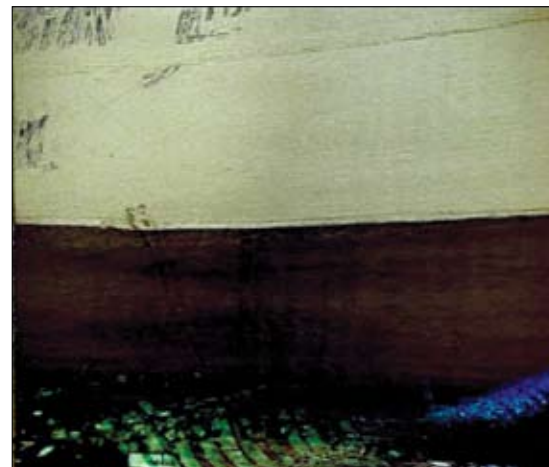
#262->URL[3462] Countries like **India**, Iceland, China, Russia, and USA enjoy growth and development of aluminium production. #263->URL[3436] Replacing steel by aluminium can reduce the **body** mass by around 40 %. #264->URL[3436] Many of these different methods are used for welding aluminium, e.g. mig, tig, laser and **plasma** welding. #265->URL[3462] By that time the share of aluminium in each **car** will have increased several times. #266->URL[3345] Aluminium industry Alcoa CEO's 2007 compensation doubles to over \$25m 18 march Pittsburgh, Dow Jones Pittsburgh - **Alcoa** inc. #267->URL[3445] The aluminium sector is the leader of **Russian** industry. #268->URL[3373] Aluminium rapidly replaced wood and other materials traditionally used in the industry and the first **aeroplane** made completely of aluminium appeared at the beginning of 1920s. #269->URL[3364] Even after 30 years of active use, aluminium **ships** remain without signs of metal fatigue and are easy to maintain. #270->URL[3389] Even at present, the number of **people** working in the aluminium industry, including workers of allied industries and social services, is estimated to be 1 million people.



#271 FILM[Metal in Harmony 1]->[08:07:07]->KEYWORD[forgings]



#272 FILM[Metal in Harmony 1]->[08:08:52]->KEYWORD[applies]



#273 FILM[Metal in Harmony 1]->[08:11:31]->KEYWORD[cargo]



#274 FILM[Metal in Harmony 1]->[08:17:16]->KEYWORD[assets]



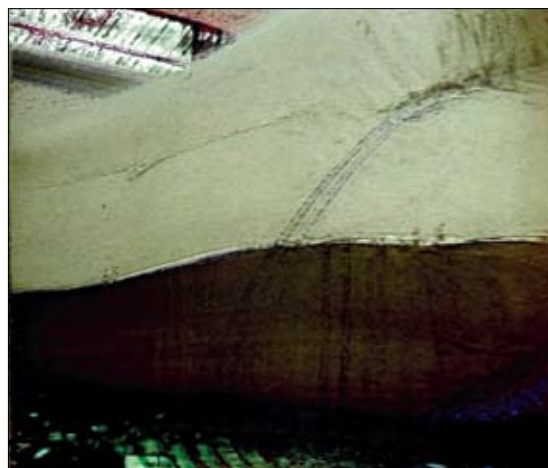
#275 FILM[Metal in Harmony 1]->[08:20:51]->KEYWORD[tonnes]



#276 FILM[Metal in Harmony 1]->[08:21:39]->KEYWORD[cuprum]



#277 FILM[Metal in Harmony 1]->[08:12:20]->KEYWORD[triumph]



#278 FILM[Metal in Harmony 1]->[08:13:04]->KEYWORD[bauxite]



#279 FILM[Metal in Harmony 1]->[08:14:40]->KEYWORD[emits]

#271->URL[3417] Aluminium in all its various forms, plate, sheet, extrusions, castings and **forgings** is increasing across the whole range of transport applications. #272->URL[3436] In principle this **applies** for all metals, including aluminium. #273->URL[3386] By using the aluminium, it is possible to reduce the weight of a truck or bus by 1,800-1,900 kilograms and enable them to carry much more **cargo**. #274->URL[3445] Century aluminium was founded by the Swiss company Glencore international, as a holding for its aluminium **assets**, in 1995. #275->URL[3364] This new method ensured an increase of aluminium production up to 8000 **tonnes** per annum by 1900. #276->URL[3460] This problem was solved by Alfred Wilm, a German chemist, who melted aluminium with small quantities of **cuprum**, magnesium and manganese. #277->URL[3445] This was the beginning of the aluminium world's **triumph**. #278->URL[3460] Production of alumina: alumina, the raw material for primary aluminium production, is extracted from **bauxite**. #279->URL[3460] The aluminium industry **emits** certain greenhouse gases.



#280 FILM[Metal in Harmony 1]->[08:42:28]->KEYWORD[anodic]



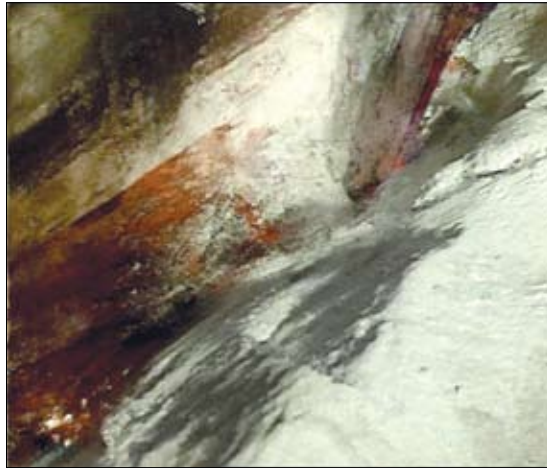
#281 FILM[Metal in Harmony 1]->[08:43:52]->KEYWORD[electrodes]



#282 FILM[Metal in Harmony 1]->[08:44:36]->KEYWORD[oxygen]



#283 FILM[Metal in Harmony 1]->[08:30:04]->KEYWORD[crucible]



#284 FILM[Metal in Harmony 1]->[08:30:31]->KEYWORD[smelter]



#285 FILM[Metal in Harmony 1]->[08:31:32]->KEYWORD[crlyolite]



#286 FILM[Metal in Harmony 1]->[08:54:12]->KEYWORD[employs]

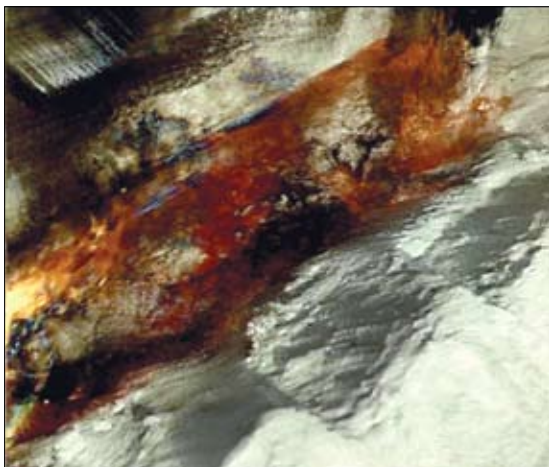


#287 FILM[Metal in Harmony 1]->[08:49:04]->KEYWORD[employs]



#288 FILM[Metal in Harmony 1]->[08:52:12]->KEYWORD[ladders]

#280->URL[3436] For ac-electrograining, during the **anodic** charge cycle, the pits, initiated by the graining solution anions, grow due to aluminium oxidation. #281->URL[3436] In an ac-electrolytic process, the two **electrodes** (aluminium printing plates in this case) are alternately anode and cathode. #282->URL[3442] Alumina is fed into the electrolyte and separates into positively charged ions of aluminium and negatively charged ions of **oxygen**. #283->URL[3442] The molten aluminium settles at the bottom of the cell where, at regular intervals, it is extracted or tapped using a vacuum **crucible**. #284->URL[3423] 23 years later, this reaction was applied to produce aluminium at a **smelter** in Gmelingen, Germany. #285->URL[3445] It is based on the following principle: when the alumina solution is electrolyzed in molten **crlyolite**, pure aluminium is produced. #286->URL[3460] The European aluminium industry directly **employs** 236.000 people. #287->URL[3460] The European aluminium industry directly **employs** about 250 000 people. #288->URL[3458] Structures like offshore living quarters, helicopter decks, balustrades, scaffolding and **ladders**, are also commonly made of aluminium.



#289 FILM[Metal in Harmony 1]->[08:28:44]->KEYWORD[flexible]



#290 FILM[Metal in Harmony 1]->[08:29:20]->KEYWORD[process]



#291 FILM[Metal in Harmony 1]->[08:29:44]->KEYWORD[process]



#292 FILM[Metal in Harmony 1]->[08:37:00]->KEYWORD[chosen]



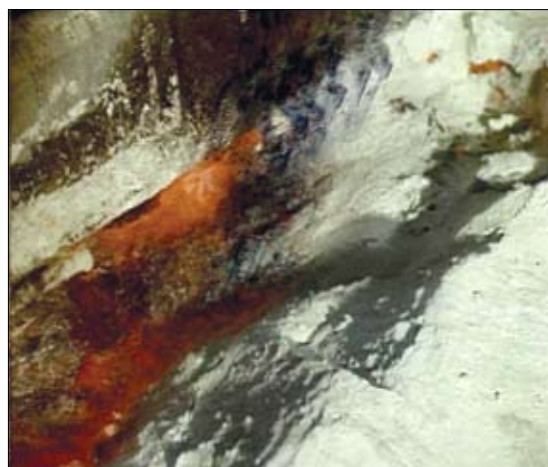
#293 FILM[Metal in Harmony 1]->[08:37:36]->KEYWORD[acid]



#294 FILM[Metal in Harmony 1]->[08:37:44]->KEYWORD[alumina]



#295 FILM[Metal in Harmony 1]->[08:31:51]->KEYWORD[primary]



#296 FILM[Metal in Harmony 1]->[08:34:39]->KEYWORD[smelter]



#297 FILM[Metal in Harmony 1]->[08:35:04]->KEYWORD[heads]

#289->URL[3436] More generally, **flexible** cables for electrical applications often use multi-stranded aluminium wires. #290->URL[3424] The aluminium metal is then produced from alumina by passing an electric current through it in a **process** called 'electrolytic reduction'. #291->URL[3436] This electrolytic **process** is driven by the application of an ac-current or an ac-potential across the aluminium surface. #292->URL[3436] To meet these different requirements, different aluminium alloys are **chosen**. #293->URL[3436] Above pH 10 aluminium is oxidised as aluminate ions, which are unstable in the bulk of the **acid** solution and consequently precipitate at the pit site, forming a hydroxide-etch film. #294->URL[3445] By passing chlorine through a hot mixture of **alumina** and coal, he produced aluminium chloride. #295->URL[3460] Production of **primary** aluminium is produced by electrolysis. #296->URL[3445] From 1888, Hall worked for the reduction company of Pittsburgh, which constructed the first large aluminium **smelter**. #297->URL[3368] From 1904 to 1906, Wagner constructed the postal deposit bank, decorating the facade were fixed to walls with aluminium bolts with protruding **heads**.



#298 FILM[Metal in Harmony 1]->[08:26:59]->KEYWORD[electrical]



#299 FILM[Metal in Harmony 1]->[08:27:27]->KEYWORD[tonnes]



#300 FILM[Metal in Harmony 1]->[08:27:43]->KEYWORD[alloys]



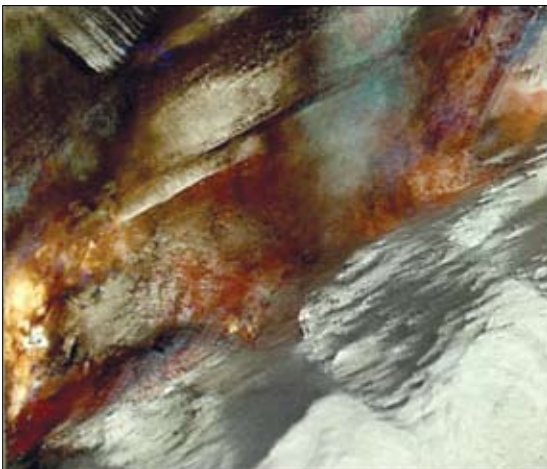
#301 FILM[Metal in Harmony 1]->[08:39:20]->KEYWORD[electrolyte]



#302 FILM[Metal in Harmony 1]->[08:41:08]->KEYWORD[western]



#303 FILM[Metal in Harmony 1]->[08:40:16]->KEYWORD[melted]



#304 FILM[Metal in Harmony 1]->[08:28:00]->KEYWORD[hall]



#305 FILM[Metal in Harmony 1]->[08:28:12]->KEYWORD[davy]



#306 FILM[Metal in Harmony 1]->[08:28:35]->KEYWORD[smelters]

#298->URL[3436] In the aluminium liquid-contact set-up there are no solid **electrical** contact points. #299->URL[3417] A 96 metre wave piercing catamaran can contain up to 400 **tonnes** of aluminium. #300->URL[3436] Aluminium and its **alloys**, as with most metals, are never completely uniform in all directions some degree of anisotropy is always present. #301->URL[3436] The electrical current is carried from the first contact plate to the aluminium coil via the **electrolyte**, then travels through the aluminium web. #302->URL[3445] The demand from **western** transport manufacturers is 26% for primary aluminium and 38% for secondary aluminium. #303->URL[3366] The electrolysis of aluminium oxide **melted** in cryolite produced wonderful results, but required a lot of power. #304->URL[3460] Pure aluminium is extracted from alumina by the **Hall**-Heroult process. #305->URL[3445] If I was lucky to extract the metallic substance I was searching for i would propose a name for it aluminium, wrote **Davy**. #306->URL[3383] If a company uses power generated by hydro power plants, as many Russian aluminium **smelters** do, this problem disappears.



#307 FILM[Aluminum on the March]->[02:44:08]->KEYWORD[furnace]



#308 FILM[Aluminum on the March]->[02:46:18]->KEYWORD[metallic]



#309 FILM[Aluminum on the March]->[02:46:23]->KEYWORD[fluoride]



#310 FILM[Metal in Harmony 1]->[08:38:43]->KEYWORD[engines]



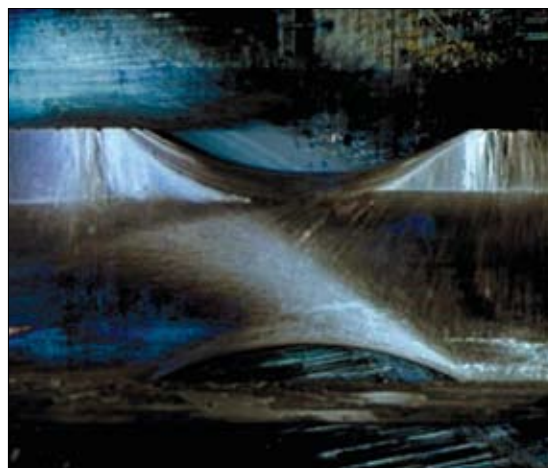
#311 FILM[Metal in Harmony 1]->[08:37:59]->KEYWORD[ferry]



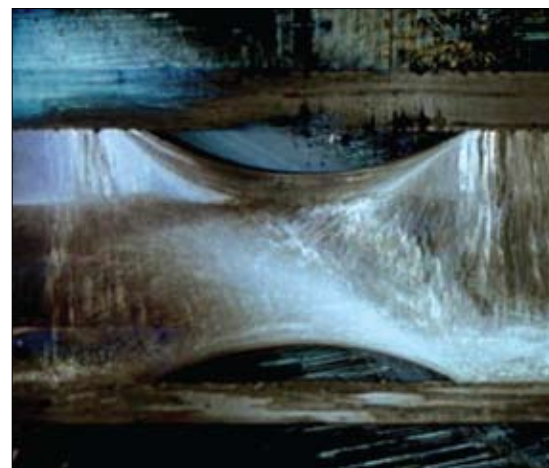
#312 FILM[Metal in Harmony 1]->[08:39:08]->KEYWORD[modern]



#313 FILM[Aluminum on the March]->[02:46:27]->KEYWORD[power]



#314 FILM[Aluminum on the March]->[02:46:37]->KEYWORD[liquid]



#315 FILM[Aluminum on the March]->[02:46:43]->KEYWORD[packaging]

#307->URL[3436] A controlled furnace atmosphere is vital it is designed to help disrupt the native oxide film on aluminium, and to improve the wetting of the oxide-covered aluminium by the liquid cladding alloy. #308->URL[3436] Then, alumina is reduced by electrolysis into molten metallic aluminium through the Hall-Heroult process. #309->URL[3442] The raw materials required to produce one tonne of aluminium are 1.9 tonnes of alumina; 418 kg of carbon (a blend of petroleum coke and pitch) and 17.5 kg of aluminium fluoride. #310->URL[3461] Today, 50% of outboard engines are made of aluminium. #311->URL[3425] Up to 400 tonnes of aluminium may be used in a modern ferry boat. #312->URL[3385] Various types of aluminium products are used in modern construction. #313->URL[3445] Wires for high-voltage power lines and cables are made of aluminium. #314->URL[3460] The reduction of alumina into liquid aluminium is operated at around 950 degrees celsius in a fluorinated bath under high intensity electrical current. #315->URL[3351] Yes, if we use aluminium packaging!



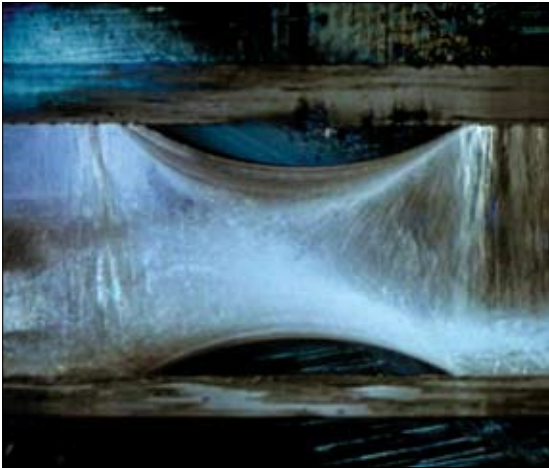
#316 FILM[Metal in Harmony 1]->[08:58:23]->KEYWORD[tons]



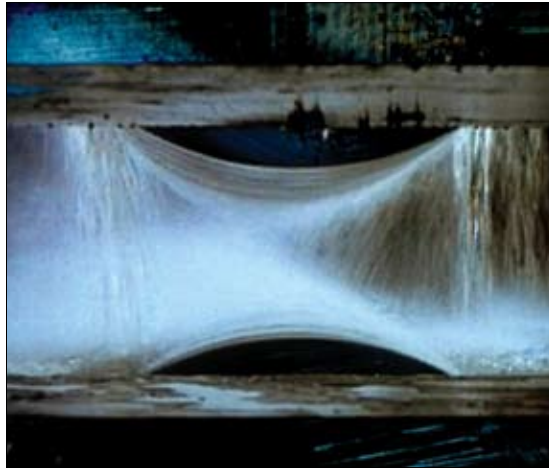
#317 FILM[Metal in Harmony 1]->[08:58:44]->KEYWORD[distort]



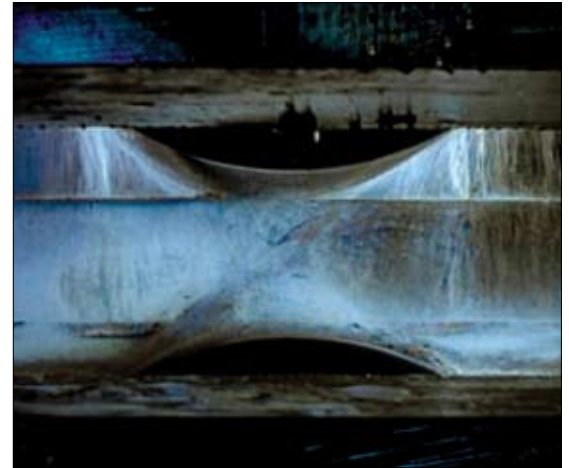
#318 FILM[Metal in Harmony 1]->[08:58:59]->KEYWORD[oxide]



#319 FILM[Aluminum on the March]->[02:46:48]->KEYWORD[solar]



#320 FILM[Aluminum on the March]->[02:47:01]->KEYWORD[pit]



#321 FILM[Aluminum on the March]->[02:47:22]->KEYWORD[alumina]



#322 FILM[Metal in Harmony 1]->[08:58:59]->KEYWORD[smelters]



#323 FILM[Metal in Harmony 1]->[08:59:55]->KEYWORD[bumper]



#324 FILM[Metal in Harmony 1]->[09:05:28]->KEYWORD[emitted]

#316->URL[3421] Aluminium 516 mill tons. #317->URL[3436] By adding small amounts of alloying elements, the solute atoms replace aluminium ones, causing the crystal lattice to distort. #318->URL[3436] In this process the native oxide on aluminium is first 'disrupted', otherwise it would compromise the adhesion of the nickel coating. #319->URL[3436] The solar water heating system has been built entirely from aluminium, except the solar collectors. #320->URL[3436] These substances pit or dissolve the tenacious oxide on the aluminium surface, leading to good wetting with the molten clad alloy. #321->URL[3421] Alumina is then transformed into aluminium through electrolytic reduction. #322->URL[3435] Aluminium production technology applies pre-baked anodes, a method used at many European and American aluminium smelters, and characterised by less power consumption and a negative impact on the environment. #323->URL[3448] The aluminium bumper beam saved 2.6 kilograms (kg) over the high-strength steel beam. #324->URL[3448] This model accounts for all greenhouse gases emitted during aluminium production, vehicle use and end-of-life processing.



#325 FILM[Metal in Harmony 1]->[11:07:04]->KEYWORD[smelters]



#326 FILM[Metal in Harmony 1]->[11:07:07]->KEYWORD[cycle]



#327 FILM[Metal in Harmony 1]->[11:07:23]->KEYWORD[speed]



#328 FILM[Metal in Harmony 1]->[10:29:24]->KEYWORD[car]



#329 FILM[Metal in Harmony 1]->[10:29:55]->KEYWORD[alloys]



#330 FILM[Metal in Harmony 1]->[10:29:31]->KEYWORD[prices]



#331 FILM[Metal in Harmony 1]->[11:07:27]->KEYWORD[europe]



#332 FILM[Metal in Harmony 1]->[11:13:55]->KEYWORD[cans]



#333 FILM[Metal in Harmony 1]->[11:14:44]->KEYWORD[heat]

#325->URL[3435] The Bayer and Hall-Heroult processes are still applied at modern aluminium **smelters**. #326->URL[3425] A “cradle to cradle” **cycle** of an aluminium product system can be modelled using different process steps. #327->URL[3446] The use of aluminium combined with the use of water-jet propulsion made it possible to create the so-called high-**speed** ferries. #328->URL[3427] There has therefore been a long history of co-operation between the **car** industry and the aluminium industry. #329->URL[3458] There is only one worldwide registration system for aluminium and aluminium **alloys**. #330->URL[3462] These inventions sealed the fate of aluminium by 1890 the cost of aluminium had tumbled some 80 percent from Deville’s **prices**. #331->URL[3460] The total market including central eastern **Europe** grew by 16% to more than 32.7 billion aluminium cans. #332->URL[3458] The total number of aluminium beverage **cans** in Europe rose from 25.1 to 28.3 billion units, resulting in an overall aluminium share of 68% in Europe. #333->URL[3378] In addition, aluminium panels trap **heat**.



#334 FILM[Metal in Harmony 1]->[11:15:28]->KEYWORD[research]



#335 FILM[Metal in Harmony 1]->[11:15:55]->KEYWORD[toughness]



#336 FILM[Metal in Harmony 1]->[11:16:51]->KEYWORD[scientist]



#337 FILM[Metal in Harmony 1]->[11:17:47]->KEYWORD[scrap]



#338 FILM[Metal in Harmony 1]->[11:18:04]->KEYWORD[persons]



#339 FILM[Metal in Harmony 1]->[11:18:23]->KEYWORD[material]



#340 FILM[Metal in Harmony 1]->[11:18:44]->KEYWORD[russia]



#341 FILM[Metal in Harmony 1]->[11:19:16]->KEYWORD[jewellers]



#342 FILM[Metal in Harmony 1]->[11:20:00]->KEYWORD[1940s]

#334->URL[3421] He has been the investigator for many **research** programmes on aluminium recycling, filiform corrosion, and surface modification issues of aluminium. #335->URL[3436] Two types of test are most widely used to measure fracture **toughness** in aluminium alloys. #336->URL[3445] These attempts failed, but the **scientist** produced an aluminium-iron alloy. #337->URL[3460] The high **scrap** value of aluminium is one of the key success factors. #338->URL[3460] The indirect employment of **persons** working with aluminium can amount to 1 million persons in Europe. #339->URL[3445] In recent years, aluminium has been increasingly applied as a main **material** in the restoration and reconstruction of historical buildings. #340->URL[3445] In terms of primary aluminium production, **Russia** is second only to China. #341->URL[3445] One of the first aluminium **jewellers** was Honore-Severin Bourdoncle. #342->URL[3442] Since the **1940s**, aluminium has almost replaced cuprum in high-voltage power lines and today it is the most efficient way of transmitting electric power.



#343 FILM[Metal in Harmony 1]->[11:20:39]->KEYWORD[planes]



#344 FILM[Metal in Harmony 1]->[11:20:51]->KEYWORD[scientific]



#345 FILM[Metal in Harmony 1]->[11:21:12]->KEYWORD[seawater]



#346 FILM[Metal in Harmony 1]->[11:21:36]->KEYWORD[cars]



#347 FILM[Metal in Harmony 1]->[11:22:52]->KEYWORD[products]



#348 FILM[Metal in Harmony 1]->[11:23:52]->KEYWORD[sounding]



#349 FILM[Metal in Harmony 1]->[11:25:07]->KEYWORD[bond]



#350 FILM[Metal in Harmony 1]->[11:26:27]->KEYWORD[abundant]

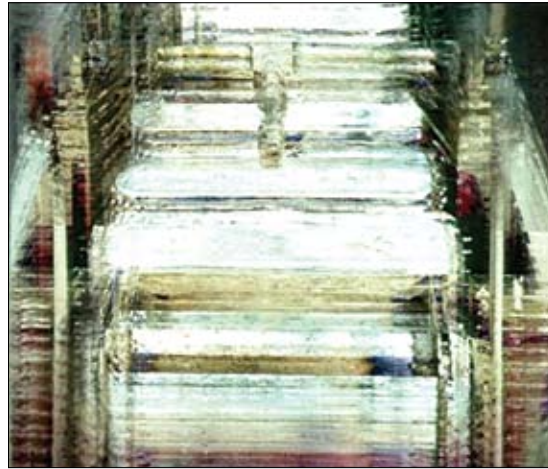


#351 FILM[Metal in Harmony 1]->[11:28:00]->KEYWORD[stable]

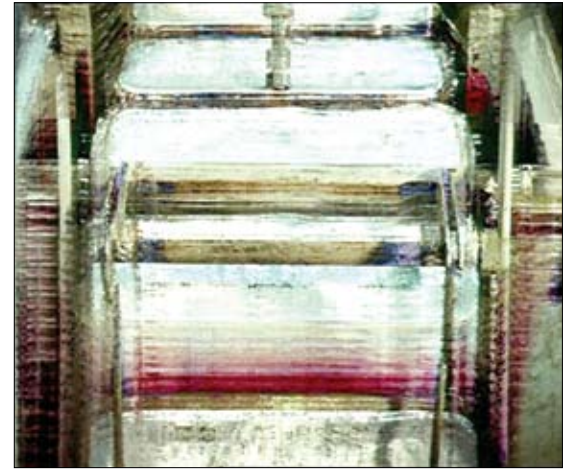
#343->URL[3460] Quite a few **planes** get hit, but because they're made of aluminium, it goes in one end and out the other. #344->URL[3421] The aluminium companies are well represented, as are instrument manufacturers and researchers from the international **scientific** community. #345->URL[3436] The corrosivity of **seawater** varies from one ocean to the next, and thus the nautilus must be built with aluminium. #346->URL[3460] The present section covers aluminium applications in trucks buses, railways, marine and aeronautics, while passenger **cars** are treated separately in the automotive section. #347->URL[3460] The recuperation of used aluminium **products** is thus both energy-efficient and cost-efficient. #348->URL[3458] The name was re-spelt as the more pleasant **sounding** aluminium by later scientists. #349->URL[3462] The new aluminium range is perfect for **Bond** it not only looks sensational, but, like all aluminium products, it is built to last. #350->URL[3456] Both steel and aluminium are **abundant** and easily available resources. #351->URL[3445] However, not only the representatives of high design ensured a **stable** place for aluminium in architecture and construction.



#352 FILM[Metal in Harmony 1]->[09:27:31]->KEYWORD[he]



#353 FILM[Metal in Harmony 1]->[09:28:00]->KEYWORD[goods]



#354 FILM[Metal in Harmony 1]->[09:28:44]->KEYWORD[machining]



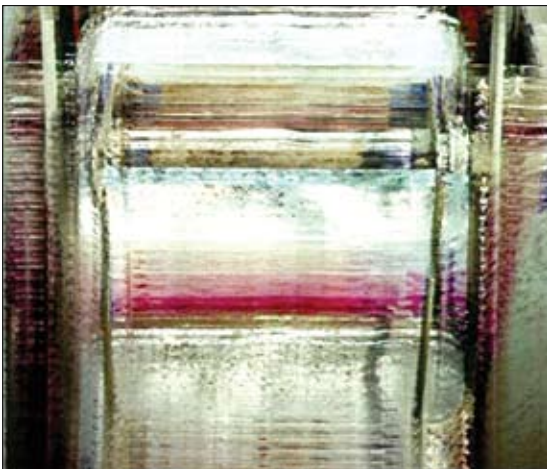
#355 FILM[Metal in Harmony 1]->[09:11:00]->KEYWORD[spot]



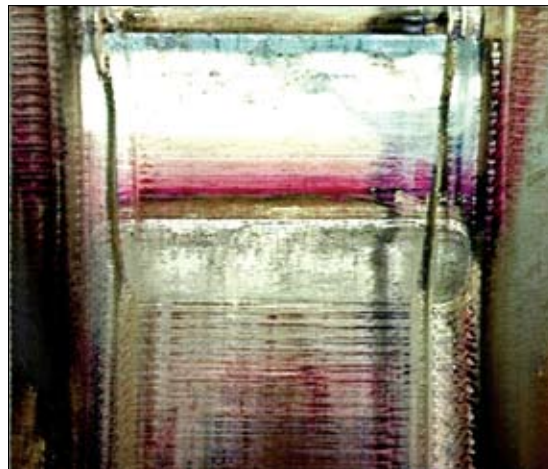
#356 FILM[Metal in Harmony 1]->[09:11:27]->KEYWORD[material]



#357 FILM[Metal in Harmony 1]->[09:13:28]->KEYWORD[stronger]



#358 FILM[Metal in Harmony 1]->[09:29:24]->KEYWORD[stored]

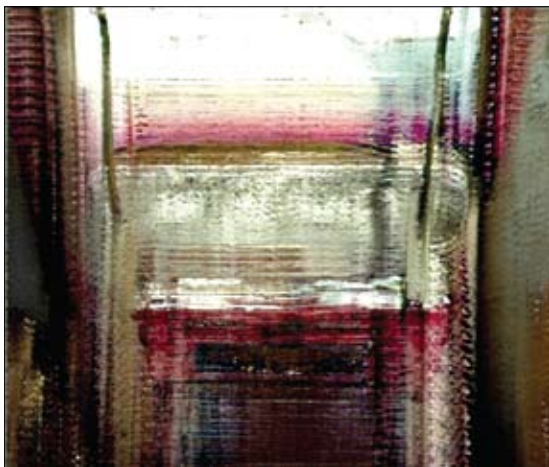


#359 FILM[Metal in Harmony 1]->[09:30:20]->KEYWORD[suitcase]



#360 FILM[Metal in Harmony 1]->[09:30:35]->KEYWORD[tonnes]

#352->URL[3421] He has also been a part of the European research initiatives on aluminium including EATP 2030. #353->URL[3445] By 1937, 75% of his goods were made of aluminium, which is resistant to corrosion. #354->URL[3436] The Aeronautics aluminium moulding industry automotive material removal machining techniques have progressed immensely. #355->URL[3436] Resistance spot welding of aluminium is therefore a surface-critical process. #365->URL[3463] Get an insight into the great versatility and unique properties which make aluminium a material of choice. #357->URL[3364] Down-gauging, using thinner and stronger aluminium sections, is constantly researched and developed. #358->URL[3460] Energy is stored in aluminium products and can be re-used. #359->URL[3460] Featuring a specially treated aluminium shell and a magnesium frame, the suitcase is both hard-wearing and ultra-light. #360->URL[3380] Finally, about 0.2 million tonnes of aluminium were used in castings for a range of building applications.



#361 FILM[Metal in Harmony 1]->[09:30:52]->KEYWORD[beverage]



#362 FILM[Metal in Harmony 1]->[09:31:00]->KEYWORD[corrosion]



#363 FILM[Metal in Harmony 1]->[09:31:04]->KEYWORD[test]



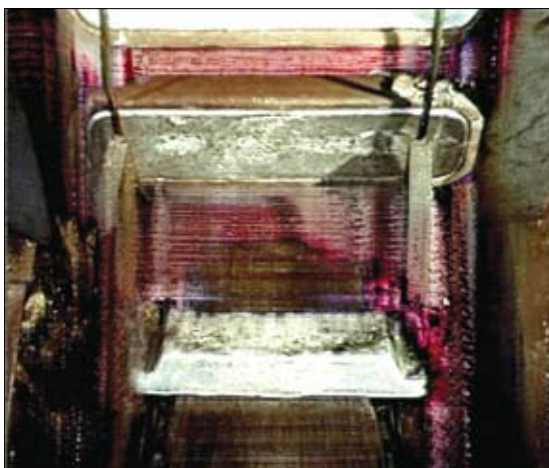
#364 FILM[Metal in Harmony 1]->[11:34:43]->KEYWORD[defects]



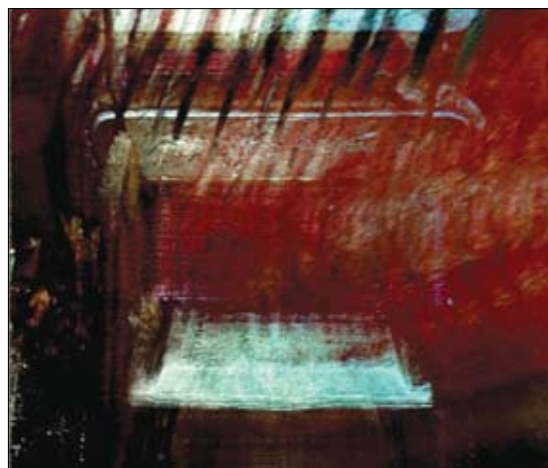
#365 FILM[Metal in Harmony 1]->[11:36:43]->KEYWORD[cans]



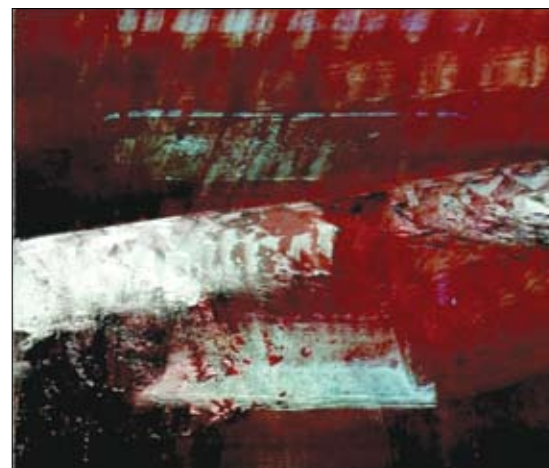
#366 FILM[Metal in Harmony 1]->[11:38:31]->KEYWORD[supply]



#367 FILM[Metal in Harmony 1]->[09:32:20]->KEYWORD[plane]



#368 FILM[Metal in Harmony 1]->[09:33:36]->KEYWORD[ingots]



#369 FILM[Metal in Harmony 1]->[09:34:43]->KEYWORD[product]

#361->URL[3346] In Europe aluminium enjoys high recycling rates ranging from 42% for beverage cans 85% in building and construction and 95% in transportation products. #362->URL[3421] His research area includes microstructure and corrosion of aluminium alloys. #363->URL[3436] The tear test can also be used for very ductile aluminium alloys, where linear elastic fracture mechanics do not apply. #364->URL[3436] A more realistic view of the aluminium surface is given, considering the different types of surface defects. #365->URL[3460] The consumption of aluminium cans in central Eastern Europe grew by nearly 1.4 billion units to a total number 10 billion cans. #366->URL[3460] The demand therefore for recycled aluminium exceeds supply for given products. #367->URL[3460] The aluminium makes the structure of the plane inherently safe, he says, and it also protects the fuel tanks, which are usually in the wings. #368->URL[3435] In 1886, he produced the first aluminium ingots by passing an electric current through a bath of alumina dissolved in cryolite. #369->URL[3457] The more aluminium there is in a product, the more chance it has of being recycled.



#370 FILM[Metal in Harmony 1]->[11:47:35]->KEYWORD[foam]



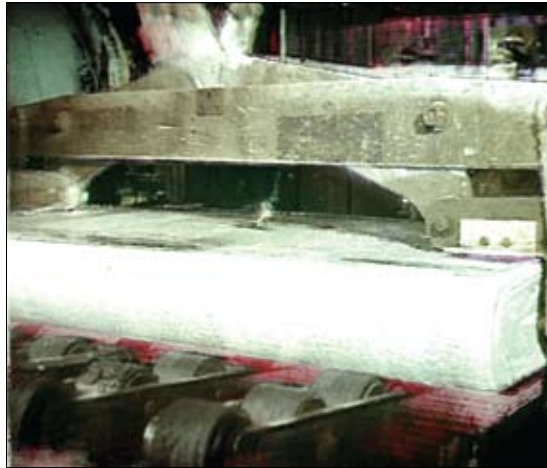
#371 FILM[Metal in Harmony 1]->[11:49:12]->KEYWORD[fibre]



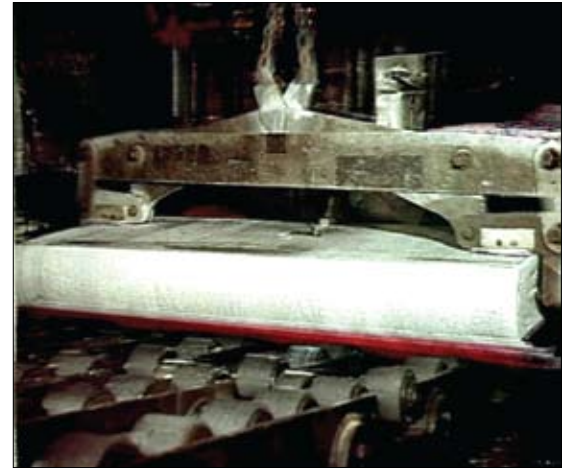
#372 FILM[Metal in Harmony 1]->[11:49:39]->KEYWORD[milling]



#373 FILM[Metal in Harmony 1]->[11:54:27]->KEYWORD[plane]



#374 FILM[Metal in Harmony 1]->[11:55:24]->KEYWORD[strength]



#375 FILM[Metal in Harmony 1]->[11:59:55]->KEYWORD[anodised]



#376 FILM[Metal in Harmony 1]->[12:02:12]->KEYWORD[bauxite]

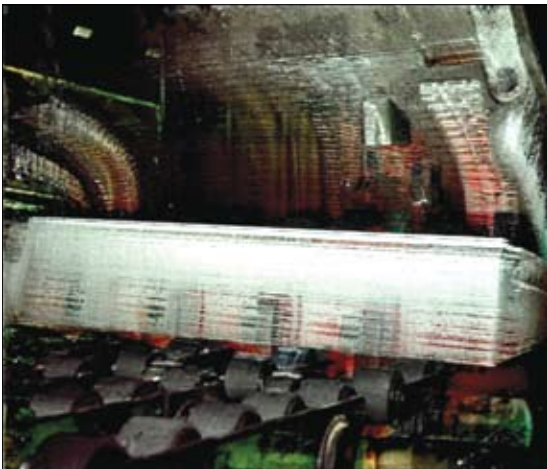


#377 FILM[Metal in Harmony 1]->[12:03:00]->KEYWORD[deeply]

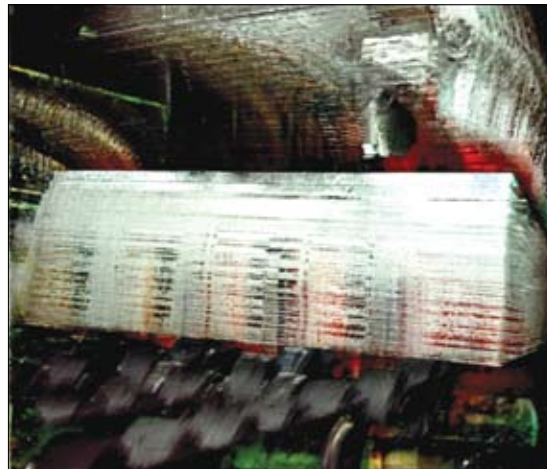


#378 FILM[Metal in Harmony 1]->[11:55:07]->KEYWORD[climate]

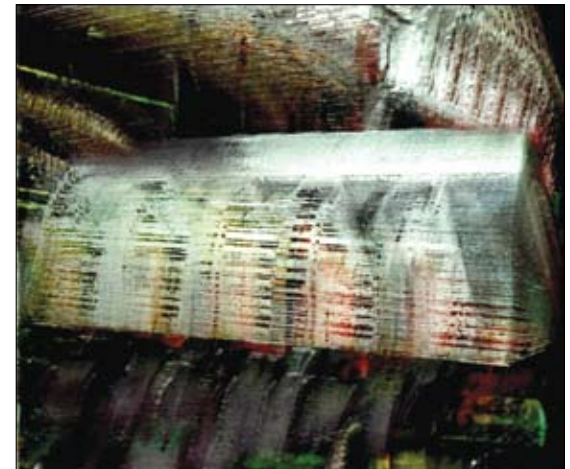
#370->URL[3436] Aluminium foam is being considered for EMS applications. #371->URL[3436] But aluminium alloys and aluminium-matrix composites, titanium and magnesium alloys, and carbon fibre composites now all compete with steel. #372->URL[3436] However, certain characteristics are common to all milling, drilling and turning operations conducted on aluminium alloys. #373->URL[3460] The key to a plane's protection is its aluminium skin which conducts the electricity away, says John Sherlock. #374->URL[3443] The strength of aluminium is its sustainability. #375->URL[3460] The stunning art deco-inspired empire state building in New York was the first building to use anodised aluminium components back in 1931. #376->URL[3460] The success of the Hall-Heroult process was advanced when Karl Bayer, an Austrian, invented a process for making aluminium oxide from bauxite. #377->URL[3448] The aluminium industry is deeply involved in aluminium recycling. #378->URL[3451] The aluminium industry is part of the answer to climate change.



#379 FILM[Metal in Harmony 1]->[12:05:55]->KEYWORD[compared]



#380 FILM[Metal in Harmony 1]->[12:06:28]->KEYWORD[produced]



#381 FILM[Metal in Harmony 1]->[12:07:00]->KEYWORD[produced]



#382 FILM[Metal in Harmony 1]->[12:08:04]->KEYWORD[primary]



#383 FILM[Metal in Harmony 1]->[12:09:15]->KEYWORD[europe]



#384 FILM[Metal in Harmony 1]->[12:09:52]->KEYWORD[Squeeze]



#385 FILM[Metal in Harmony 1]->[12:10:11]->KEYWORD[solar]

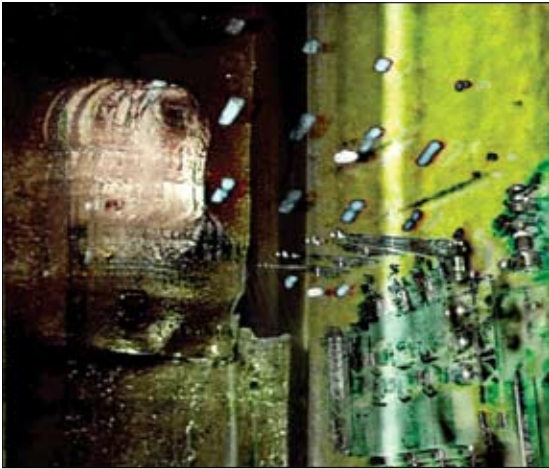


#386 FILM[Metal in Harmony 1]->[12:12:04]->KEYWORD[barrier]

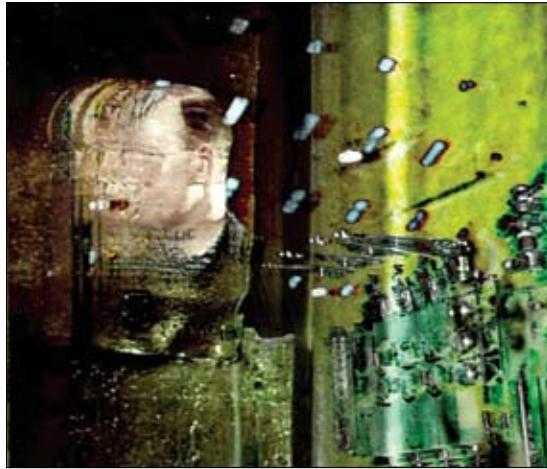


#387 FILM[Metal in Harmony 1]->[12:16:39]->KEYWORD[dried]

#379->URL[3436] However, **compared** to other materials, aluminium has good machinability. #380->URL[3445] In 2006 Alba has **produced** 2.3% of the world's aluminium. #381->URL[3445] In 2006 the company has **produced** 3.55 mln m.t. of primary aluminium. #382->URL[3460] During the first process, **primary** or secondary aluminium is cast into rolling ingot (slab), extrusion ingot (billet) and wire bar ingot. #383->URL[3436] The aluminium share in western **Europe** rose 4% to 56%. #384->URL[3440] **Squeeze** casting forces liquid aluminium to infiltrate the preform. #385->URL[3460] Thanks to the metal's inherent sturdiness, aluminium window and curtain wall frames can be very narrow, maximising **solar** gains. #386->URL[3460] The aluminium **barrier** also plays the essential role of keeping the contents fresh. #387->URL[3422] The aluminium hydroxide is then precipitated from the soda solution, washed and **dried** while the soda solution is recycled.



#388 FILM[Metal in Harmony 1]->[12:17:35]->KEYWORD[primary]



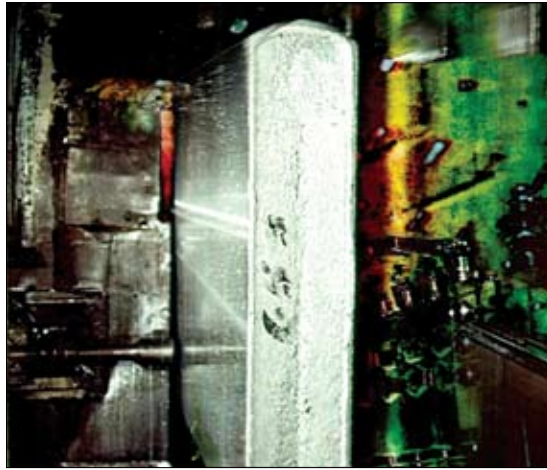
#389 FILM[Metal in Harmony 1]->[12:17:52]->KEYWORD[foil]



#390 FILM[Metal in Harmony 1]->[12:20:04]->KEYWORD[molten]



#391 FILM[Metal in Harmony 1]->[12:20:12]->KEYWORD[cars]



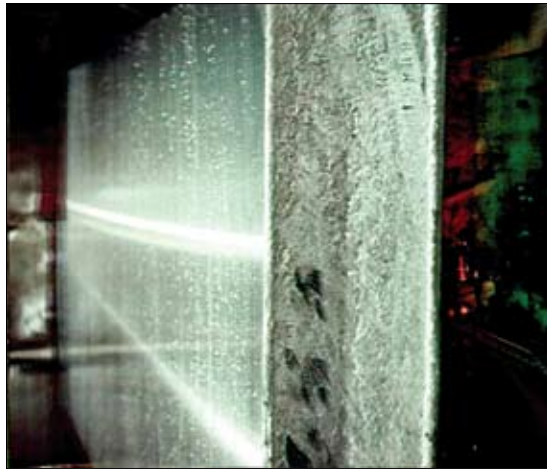
#392 FILM[Metal in Harmony 1]->[12:20:59]->KEYWORD[furniture]



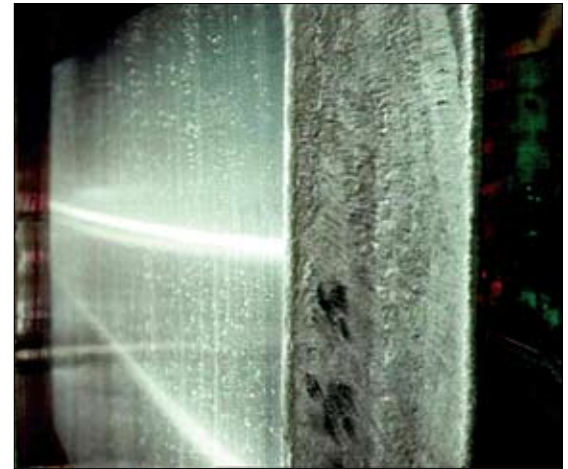
#393 FILM[Metal in Harmony 1]->[12:21:39]->KEYWORD[shipping]



#394 FILM[Metal in Harmony 1]->[12:25:07]->KEYWORD[cladding]



#395 FILM[Metal in Harmony 1]->[12:26:20]->KEYWORD[beverage]



#396 FILM[Metal in Harmony 1]->[12:27:07]->KEYWORD[century]

#388->URL[3346] Although the energy required to produce **primary** aluminium is high, it only takes 5% compared to the original energy investment to recycle the metal. #389->URL[3436] Thus capacitor **foil** is made out of high purity aluminium, mostly 99.99%. #390->URL[3436] **Molten** aluminium is deposited under a cryolite solution with 3-5% alumina. #391->URL[3445] Moreover, aluminium components can add a modern look to **cars**. #392->URL[3442] Not only the hull, but the **furniture** inside was also made of aluminium. #393->URL[3460] The application of aluminium in **shipping** extends also to other types of vessels. #394->URL[3460] Aluminium **cladding** initially conceived to last six months has served its purpose for almost 50 years. #395->URL[3460] The collection rate of aluminium **beverage** cans in western Europe has almost tripled from 21% (1991) to 60% (2005). #396->URL[3460] Successful extraction and the first commercial applications of aluminium all took place in the 19th **century**.



#397 FILM[Metal in Harmony 1]->[12:27:31]->KEYWORD[olympic]



#398 FILM[Metal in Harmony 1]->[12:27:36]->KEYWORD[products]



#399 FILM[Metal in Harmony 1]->[12:27:39]->KEYWORD[contents]



#400 FILM[Metal in Harmony 1]->[12:27:47]->KEYWORD[freedom]



#401 FILM[Metal in Harmony 1]->[12:27:55]->KEYWORD[cast]



#402 FILM[Metal in Harmony 1]->[12:29:24]->KEYWORD[sector]



#403 FILM[Metal in Harmony 1]->[12:30:04]->KEYWORD[oberlin]

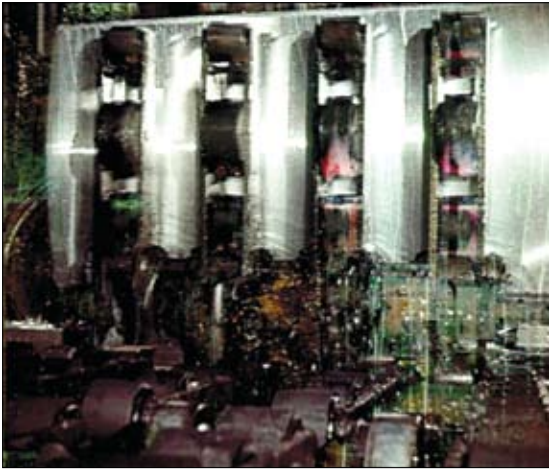


#404 FILM[Metal in Harmony 1]->[12:30:12]->KEYWORD[frames]

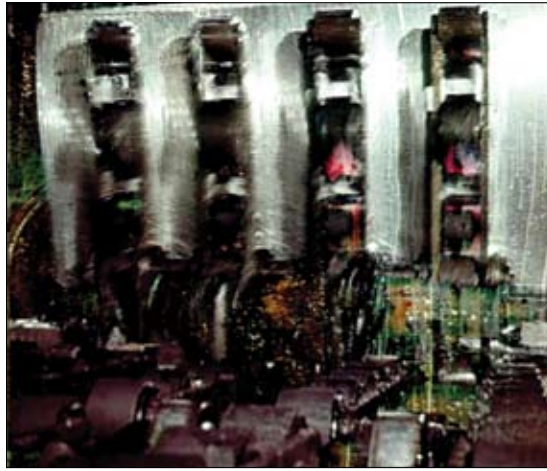


#405 FILM[Metal in Harmony 1]->[12:30:20]->KEYWORD[electricity]

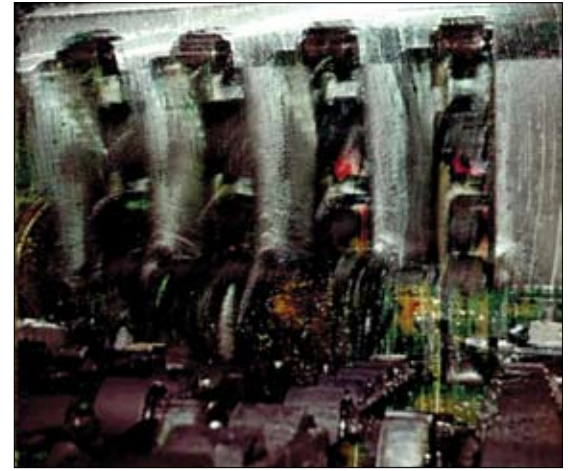
#397->URL[3425] In Athens 2004, once again the Olympic torch has been made of aluminium, this time in combination with wood, to reflect man's relationship with mother nature. #398->URL[3448] Old aluminium products can be used to produce new ones over and over again without any loss of quality. #399->URL[3463] An average aluminium can (without its contents, of course) weighed 16.55 grams in 1992. #400->URL[3442] Aluminium has been providing designers with the freedom of self-expression, and the consumer the opportunity to admire beautiful articles. #401->URL[3445] By the following year, he had obtained enough aluminium to cast a 7 kg/15 lb block. #402->URL[3435] 20% of the world's aluminium is used in the construction sector. #403->URL[3445] During his studies at Oberlin college, he became interested in chemical experiments and focused his research efforts on the methods of aluminium production. #404->URL[3445] Each year, millions of aluminium frames and doors are installed in new and old buildings. #405->URL[3445] Entire substations, where the voltage is reduced and electricity is distributed through different channels, are frequently made of aluminium.



#406 FILM[Metal in Harmony 1]->[12:33:23]->KEYWORD[yield]



#407 FILM[Metal in Harmony 1]->[12:33:59]->KEYWORD[electrolytic]



#408 FILM[Metal in Harmony 1]->[12:34:23]->KEYWORD[oxide]



#409 FILM[Metal in Harmony 1]->[12:46:47]->KEYWORD[compounds]



#410 FILM[Metal in Harmony 1]->[12:46:59]->KEYWORD[unique]



#411 FILM[Metal in Harmony 1]->[12:49:39]->KEYWORD[primary]



#412 FILM[Metal in Harmony 1]->[12:49:52]->KEYWORD[industry]



#413 FILM[Metal in Harmony 1]->[12:50:15]->KEYWORD[metal]



#414 FILM[Metal in Harmony 1]->[12:50:20]->KEYWORD[economical]

#406->URL[3436] The graphs below show the variation of **yield** strength and elongation to failure for five aluminium alloys. #407->URL[3436] The original wet **electrolytic** capacitors comprised a lead or aluminium can containing the aqueous electrolyte and the loosely coiled anode foil. #408->URL[3436] The presence of the **oxide** layer makes aluminium very suitable for many applications. #409->URL[3460] Aluminium bearing **compounds** have been used by man from the earliest times. #410->URL[3460] Aluminium has **unique** recycling qualities: the quality of aluminium is not impaired by recycling it can be repeatedly recycled. #411->URL[3460] Aluminium products can be reconverted into **primary** aluminium saving up to 95% of the energy used in their primary production. #412->URL[3460] Aluminium **industry** committed to sustainable development. #413->URL[3460] Aluminium output has increased by a factor of 13 since 1950, making aluminium the most widely used non-ferrous **metal**. #414->URL[3460] Aluminium recycling is **economical**: it uses less energy and recycling is self-supported because of the high value of used aluminium.



#415 FILM[Metal in Harmony 1]->[12:52:36]->KEYWORD[alloys]



#416 FILM[Metal in Harmony 1]->[12:53:36]->KEYWORD[oxide]



#417 FILM[Metal in Harmony 1]->[12:55:07]->KEYWORD[aware]



#418 FILM[Metal in Harmony 1]->[12:56:52]->KEYWORD[chinese]



#419 FILM[Metal in Harmony 1]->[12:57:55]->KEYWORD[alumina]



#420 FILM[Metal in Harmony 1]->[12:58:23]->KEYWORD[lisbon]



#421 FILM[Metal in Harmony 1]->[12:59:15]->KEYWORD[modest]



#422 FILM[Metal in Harmony 1]->[13:00:12]->KEYWORD[delft]

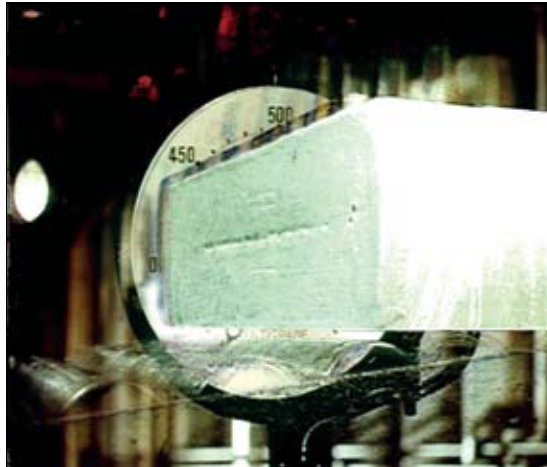


#423 FILM[Metal in Harmony 1]->[13:01:07]->KEYWORD[panels]

#415->URL[3425] In addition approximately 1.9 million tonnes of casting alloys were used from mainly the secondary aluminium industry. #416->URL[3436] This reduces the risk of burning of the aluminium coil, related to the high contact resistance of the oxide covered aluminium surface. #417->URL[3445] From that moment, the scientific community was made aware of after the existence of aluminium. #418->URL[3445] The Chinese economy already consumes a quarter of the world's aluminium production. #419->URL[3365] He called the aluminium oxide alumina. #420->URL[3460] The aluminium industry is clearly showing its willingness to play an active part in reviewing the Lisbon process. #421->URL[3460] A more modest, but still substantial, 1 million tonnes found their way into rolled products, representing approximately 24% of all rolled aluminium shipments. #422->URL[3448] A study by Delft university of technology recently revealed aluminium's considerable recycling potential in the building sector. #423->URL[3460] A thousand aluminium triangular panels are available for sale with a certificate of authenticity for collectors and Atomium enthusiasts.



#424 FILM[Metal in Harmony 1]->[13:05:59]->KEYWORD[steel]



#425 FILM[Metal in Harmony 1]->[13:06:39]->KEYWORD[tubes]



#426 FILM[Metal in Harmony 1]->[13:07:47]->KEYWORD[slabs]



#427 FILM[Metal in Harmony 1]->[13:09:47]->KEYWORD[globally]



#428 FILM[Metal in Harmony 1]->[13:16:44]->KEYWORD[greenhouse]



#429 FILM[Metal in Harmony 1]->[13:17:31]->KEYWORD[valuable]



#430 FILM[Metal in Harmony 1]->[13:33:04]->KEYWORD[trucks]



#431 FILM[Metal in Harmony 1]->[13:35:04]->KEYWORD[oxide]



#432 FILM[Metal in Harmony 1]->[13:39:08]->KEYWORD[time]

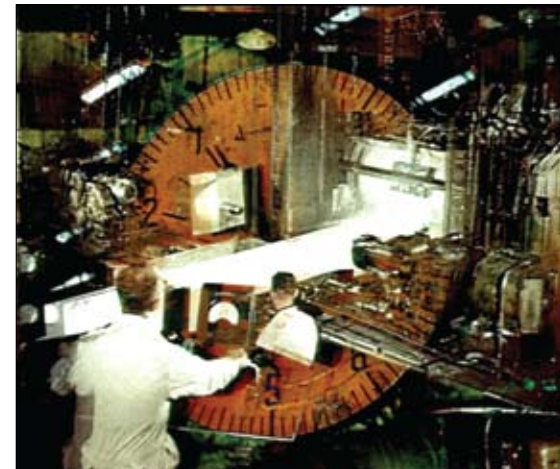
#424->URL[3436] Cladding **steel** with aluminium raises the conductivity. #425->URL[3448] Conventional air conditioning heat exchangers use copper **tubes** and aluminium fins. #426->URL[3452] This molten aluminium (also called primary aluminium) is then cast into ingots for subsequent remelting or more usually into cylindrical extrusion billets or rectangular rolling **slabs**. #427->URL[3463] Originating as the Pittsburgh reduction company in 1888 was led by Charles Martin Hall, Alcoa now operates in some 42 countries **globally**. #428->URL[3368] This corresponds with a saving of over 8kg of **greenhouse** gases per kg of aluminium produced. #429->URL[3360] This ensures that aluminium maintains its position as the most **valuable** material that can be recycled. #430->URL[3460] Today, aluminium is widely used in cars, **trucks**, buses, coaches, trains, metros, ships, ferries, aircraft and bicycles. #431->URL[3369] After calcination, the end-product, aluminium **oxide** (AL2O3), is a fine grained white powder. #432->URL[3458] All plain or lacquered aluminium is 100% recyclable, saving up to 95% energy **time** and time again.



#433 FILM[Metal in Harmony 1]->[13:43:44]->KEYWORD[deformed]



#434 FILM[Metal in Harmony 1]->[13:44:12]->KEYWORD[vinci]



#435 FILM[Metal in Harmony 1]->[13:44:31]->KEYWORD[lifespan]



#436 FILM[Metal in Harmony 1]->[13:50:55]->KEYWORD[clean]



#437 FILM[Metal in Harmony 1]->[13:51:43]->KEYWORD[scrap]



#438 FILM[Metal in Harmony 1]->[13:51:52]->KEYWORD[effective]



#439 FILM[Metal in Harmony 1]->[13:58:15]->KEYWORD[airplanes]



#440 FILM[Metal in Harmony 1]->[13:58:28]->KEYWORD[cans]



#441 FILM[Metal in Harmony 1]->[14:01:47]->KEYWORD[cell]

#433->URL[3424] Material and mechanical properties dead fold: when fully annealed, aluminium foil retains no 'temper' and therefore retains its shape when **deformed**. #434->URL[3436] However, the corrosion resistance of this alloy is not as good as that of most other aluminium alloys, and Da Vinci Airways may reject it. #435->URL[3436] This adhesion ensures, for example, a **lifespan** of over 25 years for coated aluminium window frames. #436->URL[3463] Please advise me on how to **clean** and keep aluminium in a good condition. #437->URL[3463] The London metal exchange quotes aluminium **scrap** prices. #438->URL[3421] Also, **effective** use of recycled aluminium means that in most cases upgrading to pure metal is necessary. #439->URL[3458] Today aluminium accounts for approximately 80 percent of the structural weight of modern **airplanes**. #440->URL[3460] Today, 7 out of 10 **cans** produced and filled in Europe are made of aluminium. #441->URL[3460] 1888 electrolytic **cell** used for producing aluminium electrolytically from aluminium oxide (alumina) dissolved in cryolite.



#442 FILM[Metal in Harmony 2]->[14:20:15]->KEYWORD[aluminum]



#443 FILM[Metal in Harmony 2]->[14:20:28]->KEYWORD[thermos]



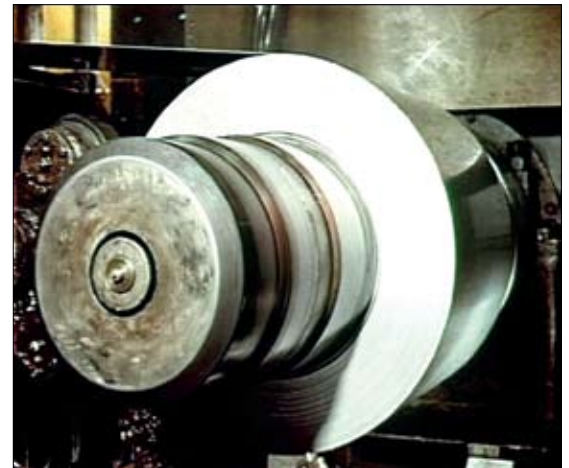
#444 FILM[Metal in Harmony 2]->[14:20:36]->KEYWORD[corrosion]



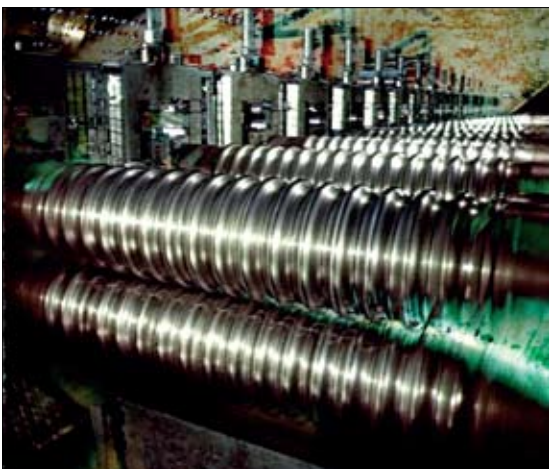
#445 FILM[Metal in Harmony 2]->[14:35:20]->KEYWORD[superior]



#446 FILM[Metal in Harmony 2]->[14:35:32]->KEYWORD[targets]



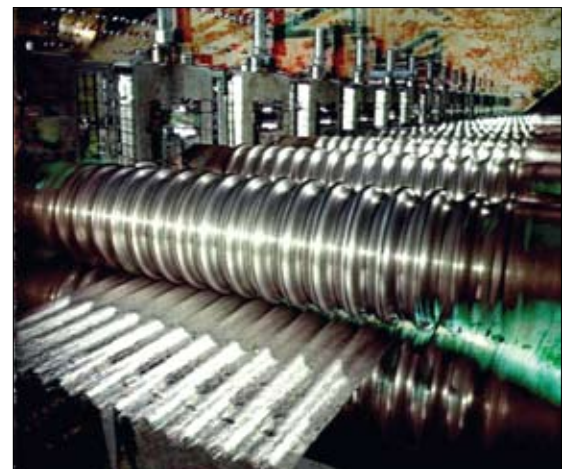
#447 FILM[Metal in Harmony 2]->[14:37:04]->KEYWORD[levels]



#448 FILM[Metal in Harmony 2]->[14:39:52]->KEYWORD[cladding]



#449 FILM[Metal in Harmony 2]->[14:40:11]->KEYWORD[louvre]

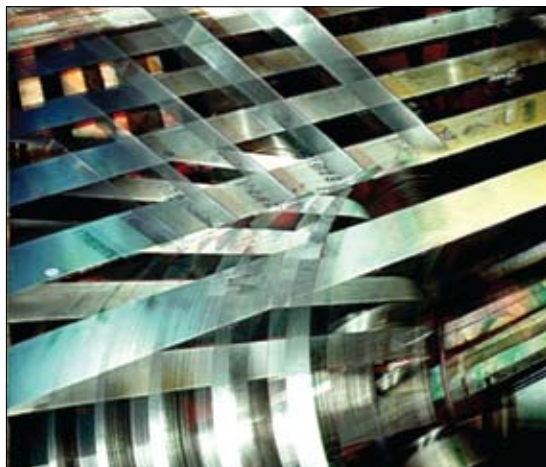


#450 FILM[Metal in Harmony 2]->[14:40:20]->KEYWORD[potash]

#442->URL[3424] Making aluminium foil **aluminum** is a very thin sheet of aluminium ranging from about 0.006mm to the upper ISO defined limit of 0.2mm (200 m). #443->URL[3436] Have you ever wondered why your aluminium **thermos** is so reflective, while your aluminium door has a matt appearance? #444->URL[3436] However, in some environments aluminium may show **corrosion** behaviour. #445->URL[3436] The ease of manufacturing enables aluminium to compete with materials which can appear **superior** on properties alone. #446->URL[3456] Both the steel and aluminium industries continue to work together towards the recycling **targets**. #447->URL[3456] The UK the **levels** of recycling achieved in 2004 were 23.4% for aluminium packaging. #448->URL[3460] The Atomium's aluminium **cladding** is ready for a new life, built for the universal exhibition of Brussels in 1958. #449->URL[3460] Aluminium was used in the Pyramide Du **Louvre** in Paris (1989) and the European parliament in Brussels (1995), which contain around 1000 tonnes of aluminium. #450->URL[3460] Davy tried unsuccessfully to produce aluminium by electrolysis of a fused mixture of aluminium oxide and **potash**.



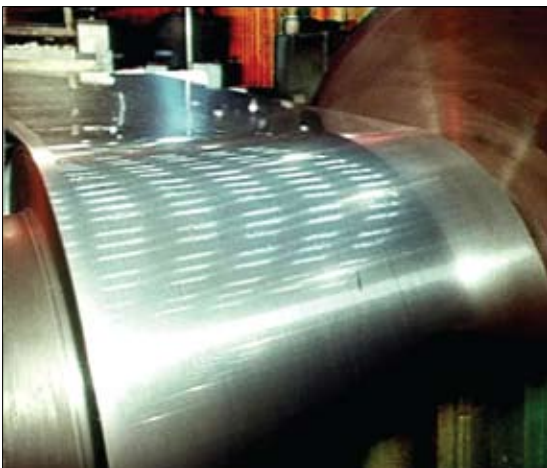
#451 FILM[Metal in Harmony 2]->[14:45:12]->KEYWORD[rolled]



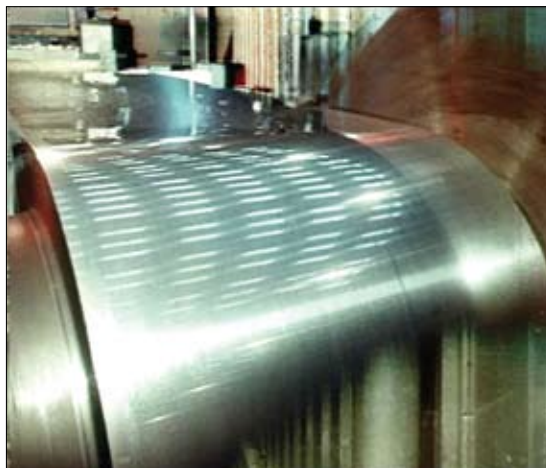
#452 FILM[Metal in Harmony 2]->[14:46:28]->KEYWORD[foil]



#453 FILM[Metal in Harmony 2]->[14:45:47]->KEYWORD[sheet]



#454 FILM[Metal in Harmony 2]->[14:44:04]->KEYWORD[belts]



#455 FILM[Metal in Harmony 2]->[14:43:23]->KEYWORD[surfaces]



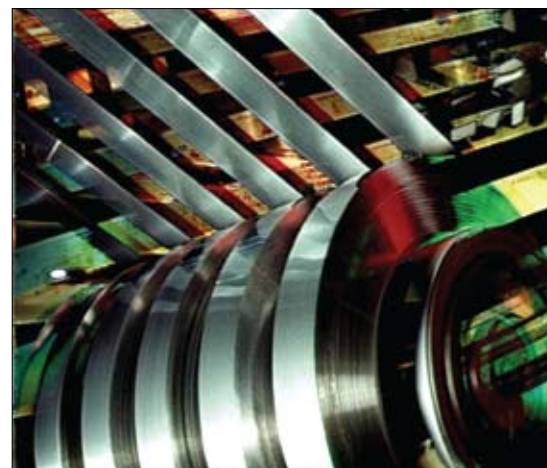
#456 FILM[Metal in Harmony 2]->[14:43:47]->KEYWORD[region]



#457 FILM[Metal in Harmony 2]->[14:47:12]->KEYWORD[paracelsus]



#458 FILM[Metal in Harmony 2]->[14:45:23]->KEYWORD[boeing]



#459 FILM[Metal in Harmony 2]->[14:47:23]->KEYWORD[television]

#451->URL[3339] Edition surface-treated aluminium semi-finished **rolled** products for high-tech, post-formable architecture. #452->URL[3424] Single rolled aluminium **foil** can also be made in thinner gauges and produces a bright finish on both sides. #453->URL[3436] By tailoring the surface of aluminium **sheet**, various optical effects can be generated. #454->URL[3445] Conveyor **belts** and automated control systems, stairs, scaffolds and fittings are all made of aluminium. #455->URL[3436] Good hydrophilic properties of oxidised aluminium **surfaces** can be created, suited for lithographic offset printing. #456->URL[3460] Europe recycles more aluminium than any other **region** in the world. #457->URL[3445] The first step in extracting aluminium was made by the famous **Paracelsus** in the 16th century. #458->URL[3445] For example, the famous **Boeing** 747 contains 75 tonnes of aluminium. #459->URL[3445] For example, one recycled aluminium can saves enough power to watch three hours of **television**.

With Respect to Residue

(The Bolzano/Bozen Variation)

Raq Media Collective

"The extraction of value from any material, place, thing or person, involves a process of refinement. During this process, the object in question will undergo a change in state, separating into at least two substances: an extract and a residue.

Coffee beans and coffee grounds, coffee grounds and a coffee pot, a coffee pot and a cup of coffee, a cup of coffee and a shot of caffeine, a shot of caffeine and a slight spike of energy, a spike of energy and a decision, a decision and its consequences, the consequences and a fragment of history, a fragment of history and an aluminium factory, an aluminium factory and aluminium, aluminium and a coffee pot, a coffee pot and coffee grounds, and so on.

With respect to residue: it may be said it is that which never finds its way into the manifest narrative of how something (an object, a

person, a state, or a state of being) is produced, or comes into existence. It is the accumulation of all that is left behind, when value is extracted. Large perforations begin to appear in chronicles, calendars and maps, and even the minute agendas of individual lives, as stretches of time, tracts of land, ways of being and doing, and entire clusters of experience are denied substance.

There are no histories of residue, no atlases of abandonment, no memoirs of what a person was but could not be.

Everything is valuable, yet all things can be laid waste.

The sediments that precipitate at the base of our experience of the world can, however, decompose to ignite strange sources of light, like will o' the wisps in marshlands by night. Sometimes, this is all the illumination there can be in vast stretches of uncertain terrain."

