

Pragma SUPPRESS¹

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(translated by Margaret Parks)

“We’re now sitting in the front working station of the maintenance tower, five hundred meters above the ground. The receiver tower is the same height. The maintenance tower has been pulled back 250 meters so that the concentrated radiation doesn’t damage it. Please come over here.”

The tourists trotted like a herd of sheep after the young man, who had introduced himself as Balduin at the beginning of the tour. He earned a bit of extra income during his semester breaks by dragging tourists through the compounds of one of the world’s largest solar power plants while he joked around with well-founded commentaries. Apparently he had done this quite often because he spoke fluently, with perhaps a bit of indifference.

“The front maintenance station is mounted on and protrudes fifty meters from the tower. That’s why we’re now only two hundred meters away from the receiver tower. You saw that the tower looks like a huge crane!

He pressed a switch.

“Don’t look directly at the receiver. The power plant is running under full capacity and it is almost noon. This means that the receiver is now being heated by all of the mirrors. It is illuminated so brightly that you would certainly suffer eye damage from it. And that, even though the receiver is coated with absorbing material and even though it has an efficient ribbed structure in order to capture all of the radiation. The receiver would look as black as coal without the radiation.”

That was no exaggeration. The sun seemed to float as the observation slit continued to open wider. The glary light that was reflected from the receiver tower was so intense that you couldn’t discern anything, neither the receiver tower itself nor the view across the barren desert.

“You should use these safety glasses. Here. They are new and you can keep them.”

After Balduin had distributed the glasses, he continued:

“As I explained on the model down below, sunlight is thrown on the receiver tower by countless mirrors. The mirrors are positioned on seven square kilometers surrounding the receiver tower. The main computer tracks each mirror individually. The maximum output of the power plant is about two gigawatts. That is so much that the capacity that is taken from the area surrounding the power plant even has a direct impact on the climate at this location: agriculture is possible under the mirror fields, but not out there in the desert.”

One of the tourists wearing sunglasses, a middle-aged man, inquired:

“Whereabouts is the computer?”

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“Do you remember the reception building when you entered the compound? That is the power plant’s only administrative building and all of the electronics are accommodated there. The receiver tower consists of only the receiver way up top, 500 meters above the ground and the turbine and generator in the shaft. Also, the maintenance tower does just what its name says: mostly nothing, or it is moved towards the receiver tower in order to perform maintenance jobs on the exterior. Something like a maintenance tower on a rocket ready to be launched.”

“And then the power plant is shut down?” asked a little girl around twelve years old.

“Oh, yes. The mirrors are then routed so that the radiation intersects approximately one kilometer above ground and five hundred meters above the receiver tower. The maintenance tower would not withstand the intensive radiation. And the technicians wouldn’t either.”

A few of the listeners laughed briefly. Balduin didn’t laugh since he told this lame joke each time. He saw that the time had come for his – so he thought – brilliant analysis of the technical details. He looked around the group to make sure they were all listening and began his speech:

“I’ve concealed something further about the computer controls. As you know, the sun moves across the sky every two minutes at the length of its own apparent diameter. So it’s not necessary to constantly adjust the mirrors. Every one of our mirrors receives a new position every 32 seconds if the orientation actually changes. We have 65,536 mirrors and each has a surface of 64 square meters. That means that for each mirror, 488 microseconds are available to recalculate the mirror orientation according to the position of the sun and the target focus. Strictly speaking, it is even less because the computer also takes care of the load adjustment to the power supply system and it decides how many mirrors actually need to be deployed. In addition there’s the whole turbine controls that are necessary in any power plant. You can’t get those results with a small PC. This is due to a lesser extent on the necessary computer capacity – you can find that in any child’s room – but rather to the countless interfaces to control elements, stepping motors and sensors.”

Balduin quickly considered whether or not the group was showing enough interest for further explanations. He decided in favor of it.

“If you enter the computing center, then it could well be that you would overlook the actual computer. Most of what is standing around there are cabinets with numerous circuit points for the lines that run from there to the sea of mirrors and to other parts of the power plant. A considerably more inconspicuous looped wiring system could have been installed. That actually happened at a few other power plants. But as far as I know, the concern took advantage of a special offer for old telemetry and motor hardware. Impressive to look at but obsolete. Just like the management here.”

They were lucky, they got the chance to witness a breakdown failure.

Some of the tourists dutifully laughed but most of the listeners seemed to be impressed. Except for the twelve-year-old girl:

“Mm. And what if an airplane flies over it?”

That was it. He was never able to end his lecture without an interruption. “Flying over the compound is not allowed. Not at such low altitudes,” he answered somewhat halfheartedly.

“Can you focus on an airplane flying higher?” someone from the last row asked.

In principle, yes. However, due to the apparent diameter of the sun, the focal spot has a minimal diameter of one hundred meters at ten kilometers altitude. The surface capacity would still be three hundred times that of normal sunlight. But you would have to pursue the focal spot for a few seconds to cause damage and you would have to do this quickly – which is impossible with our mirrors. And, to anticipate your

question, to focus on satellites is completely futile. You can only reach a radiation rate that is equivalent to normal sunlight at an altitude of two hundred kilometers. So the power plant is scarcely suitable for military purposes.”

“But it could happen...”

“In addition,” Balduin, who was sick and tired of questions regarding military solar technologies, continued, “In addition, it has been seen to that focusing is not possible at every point in space. It’s not possible merely through the mechanical suspension of the mirrors that do not allow for arbitrary movements.”

He was interrupted again. A siren was heard outside. A bit later, an alarm horn croaked in the maintenance cockpit. The tourists became nervous.

“Don’t worry, ladies and gentlemen, don’t worry.” Balduin tried to get them to listen. “That’s signalling some type of disturbance. In a way, you’re lucky: you can now witness how the power plant is shut down. Probably a leak in the water pressure line or an unforeseeable change of load ... or something like that. Maybe a million people turned their toasters on at one time. After all, this isn’t an atomic power plant.”

He pointed to a window that was still open:

“If you observe the receiver now with your safety glasses, then you will see that the crossing point of the radiation is directed overhead. Of course, every mirror has not only one set of stepping motors, but rather a small microprocessor in addition. It conducts a rotation over many angle degrees completely independently.”

They all followed his requests.

“I don’t see anything,” someone said. Balduin went to the window himself and put on his safety glasses.

“That’s funny. The receiver is no longer fully illuminated. Actually, one should already be able to see the radiation tent over the receiver. It looks very impressive, even from a distance. That’s why that picture is printed on all of our pamphlets: The radiation cathedral of Chochinga. Even at a distance of a hundred kilometers...”

The farthest mirrors suddenly illuminated to the right and to the left of the tower. Then a scythe of fire went through the field of mirrors. Balduin understood. His stomach turned. He dove to the switch.

“EVERYONE GET DOWN. THE FOCUS IS COMING THIS WAY!”

Disbelief in their faces. The observation slit began to close agonizingly slowly. But then it became brighter and brighter.

“I SAID GET DOWN!”

They had to have a chance. The reflecting light did come from the mirrors near the ground. So if they lay on the floor of the maintenance room, then at least they wouldn’t be hit directly by the light radiation.

Someone screamed as the glaring light engulfed everything. A hiss was in the air and it burned against the skin. “Shut yourself, window,” he thought. After all, it could only be a thin slit.

And, the explosion of light died as suddenly as it had appeared. The window was closed. And the lighting didn’t function. Total darkness.

Someone was crying, some were swearing. A groaning could be heard from the direction of the stairway. Steel girders worked in their bracings, stretched by the burden of unforeseeable temperatures. Balduin expected the floor to get hot. But it didn't. The focus point had wandered off. Where to?

"Listen to me, ladies and gentlemen!" he called into the darkness, which was filled with a billowing red fog. Signals from an overstrung retina.

"Listen! I don't know what has happened. But the best thing to do would be to leave the tower as quickly as possible. Can anyone see anything? Does anyone have a flashlight?"

"Is this the safe solar energy?" someone asked.

"We're not going to discuss that right now. Can anyone see anything?"

"I'm going to sue the concern. I..."

"Go ahead. I would like to point out that nothing has happened to us as of yet. But primarily we have to get downstairs now."

The floor was still not warm. That was a good sign. The front maintenance room would quickly melt under the concentrated radiation from all of the mirrors. But the noise coming from the direction of the central shaft worried him. It sounded like a firestorm.

For whatever reason, it considered the maintenance tower as the neutral focus point

"I can see something." Perhaps that was the girl who asked the question a little while ago about the shutting down of the power plant. The distant sounds of sirens reached them.

"What do you see?"

"Red light. I think it's the door we came through."

Balduin crawled through the darkness. Occasionally he ran into someone. And then he found the door. It wasn't closed but ajar. He opened it.

At the end of an approximately twenty-five meter long hallway he saw the outlines of the next door. The door was also ajar and red lines clearly marked it. He jumped up, ran to the door and cracked it open. Heat radiation slammed against him. The likewise approximately twenty-five meter long room, which still separated him from the central shaft, was brightly lit. The door on the opposite side and parts of the walls were glowing red. That's also where the thunderous noise was coming from. There was no possible way to get through. They were trapped in the tower.

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"You dare to tell me that? The emergency shutdown did not work, and you dare to tell me that?"

Lindner thought, Brockman is playing the boss once again. Wait and see what happens to the façade when he hears the whole story. He put forth:

"It did function. As well as the controls did to a neutral focus point – only the data for the focus point is not right. For some reason, it's focusing on the top of the maintenance tower. Usually the zero focus point is five hundred meters above the receiver tower. We don't know why this one isn't being used."

"Why was it shut down?" He got worked up.

“A drop in the pressure of the operating furnace. A significant drop in pressure. We had to let the receiver tower cool down. But ... that’s not the problem.”

“What next?”

“There’s a group of tourists in the maintenance tower!”

Brockman didn’t say a word. He broke out in a sweat. Not that he was afraid for the lives of the tourists. They had probably put the worst behind them by now and his imagination regarding human suffering was, in any event, not very pronounced. But they would blame him. He of all people. He would be the first man to have killed people with a harmless solar power plant. The end of his career seemed horrible, not the possible end of thirty nameless tourists.

“Can we navigate the focus back to the receiver tower?” he asked.

“Sure. But it’s under lessened pressure.” The power plant is not running. The tank would be damaged. And then we’d be out of business for months.”

“Why? If there’s still water in the tank? How can it be damaged?”

How little managers understand about the things they manage, thought Lindner contritely.

“Steam would develop if we heat the tank, which is under lessened pressure. The steam then insulates parts of the tank walls, which continuously heat up. Sooner or later we’ll have fused in holes in the tank. You know what that means.”

“Months of lost output. Yes.”

“It gets worse. The pieces of wreckage raining down would destroy large quantities of the mirrors. And then the horticultural company, that we’ve leased the land under the mirrors to, would also want compensation if we drive through there with heavy equipment.”

Brockman stepped to the window. The two towers rose to the sky a few kilometers away. A familiar picture, but the point of the maintenance tower shone in glittering light. Smoke ascended, pieces of wreckage sprayed downward now and again.

“And there’s no one left alive there?” he asked.

“Hardly. The tip of the tower is now a furnace.”

“And if the neutral focus were...”

“That is the neutral focus! For whatever reason, the computer now recognizes the tip of the maintenance tower as the focus point. Could I make a suggestion?”

“I’m listening.”

“We shut down the computer. The sun does wander on. The maintenance tower will be free in a half an hour. And we can readjust most of the mirrors manually by tomorrow. We would, however, need a few hundred specialists, probably more. No idea where we can get them from.”

“Mmh. So that’s not going to work.”

“No. But in addition we could try to move the maintenance tower closer to the receiver tower. Then the radiation would cross over in clear air in twenty-four hours.

“Is the maintenance tower still moveable?”

“It should be. The base of the tower is undamaged.”

“Good. Authorize that. And call the company POWER SOFT. They need to find out why the computer is creating so much havoc.”

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“We’ve got light again, at last,” someone said. Balduin stepped back from the observation slit.

“I can’t do any better than that. The window has a mechanical tolerance level. Otherwise I wouldn’t have even been able to open this slit at all without electricity. It’s the same throughout the whole power plant: the cheapest solution everywhere. As if the company would have gone straight into bankruptcy by splashing out on a hand crank here.”

“And what now?”

Balduin turned around and looked at the little group.

“Wait. They’ll take the focus point away from the maintenance tower. We can get through there when the rooms around the central shaft have cooled down. But the elevator will probably not be working any more.”

“And what if they don’t remove the focus?”

“The tower will burn up like tinder. Just imagine hundreds of tons of ferric oxide raining on the mirrors down there. No, they’ll undertake something quite quickly – not because of us, but because of their very expensive mirrors,” he added cynically.

He stepped back to the hallway door.

I have the impression that they have already undertaken something. You can hardly see the glowing. But, of course, we can’t get through. Not yet.”

The floor trembled. Weakly, but strong enough for a few to notice it.

“Is the tower going to topple over?” the little girl asked anxiously.

“No. I hardly think so.” Balduin went back to the observation slit. “But it is possible that the tower is being moved.”

“And why?”

“How do I know? Maybe they want to cool it down with the airstream. Without a doubt, the effect would not be so great. Funny, it can only be moved at walking speed.”

He, as well as some of the tourists, pinned themselves to the observation slit again. There wasn’t enough room for everyone because the slit was only a few meters wide.

Anyway, one thing was for sure: the receiver tower was no longer being radiated. The sea of mirrors was aligned at regular intervals but it was difficult to see where the focus was located at the moment. Probably to the side of the maintenance tower, where they couldn’t see it. Balduin knew where the roadways under the mirrors were. He had the impression that there was no traffic. Aren’t they even taking care of us?

“Of course we have the source code ready. It’s all in the listings. But that doesn’t mean that the mistake can be found and corrected in minutes.”

Dr. Koch had just arrived, straight away with the helicopter. He was the chief programmer for the system that operated the power plant. And now he was the only one who could be reached.

Lindner reassured:

“Yes, yes, I know. But we have to try everything. Every hour that the power plant isn’t running costs the corporation a quarter of a million. You do know, what a kilowatt hour costs right now.”

Koch sat down. The listings didn’t interest him in the least.

“Do you have a dump?” he asked.

“A what?”

“A storage pull-off. Best to have been printed right after the computer was shut down.”

“No. We simply shut down the computer. Nothing was printed.”

“What a shame. Oh well. Our system is very well structured. We’ll figure it out. By the way, the air in the helicopter was very dry.”

Lindner shot up like a skipjack. Within 30 seconds a beer was standing on the table in front of Koch who looked at him like a teacher looking at a schoolboy who had just made a stupid comment. It occurred to Lindner in a hot flash that Koch didn’t drink any alcohol.

“That’s for me!” he said and grabbed at the glass. He knocked it over while doing so. Dr. Koch now had a wet pair of pants. And Lindner was red-faced.

“Um, excuse me, I, um. Right away.”

Sitting there was the man who could possibly put the power plant back into operation. The primary failure was identified in the meantime – a misplaced valve had caused the drop in pressure. They could have started the power plant up again, admittedly without the software that scorched the maintenance tower. So there sat the man who could repair the software. Maybe. And what did Lindner do? He poured beer over his pants.

As they sat opposite each other for three minutes – which cost the company a further 12.500 – both with an orange juice, Koch began a monologue:

“Very well then. The computer focused on the maintenance tower instead of on the zero focus. We don’t even have to take a look at the listings. The algorithm of the focusing is all right. It’s only selected through two parameters anyway: with the coordinates for the kettle and for the coordinates of the zero focus, located 500 meters above it. Other focus points don’t appear, at least not as a reference focus point.”

“The coordinates of the tip of the maintenance tower are located in an array. That is necessary because the maintenance tower is movable. Therefore it can have diverse positions. The array is indicated between 0 and 15 because a locational resolution of 10 meters is sufficient. A one-hundred-fifty meter length of the track system. The values of the current coordinates of the maintenance tower are placed in a local variable of the algorithm, which takes care that exactly these coordinates are not focused on. If, however, it does focus there, then the focus moves immediately to the zero coordinates. ‘Raise FOCUS_ERROR’. Quite simple. Do you follow me?”

“Yes,” Lindner said, “sounds real easy. By the way, it’s two hundred meters.”

“What?”

“Two hundred meters. The length of the track system for the maintenance tower. Shortly after the power plant was completed, we decided to lengthen the tracks to the rear in order to be able to pull the working maintenance tower further away from the receiver tower. For security reasons. You understand.”

Lindner’s voice regained a bit of stability as he described these measures. He had initiated them himself and he was especially proud of it. After all, the maintenance tower had never failed – until today. He needed that now, as a backup for his self-confidence after the incident with the beer.

“You lengthened the track to the rear. So, so.” Koch’s nostrils flared: “And who adapted the software?”

Ten seconds of silence (695 EUR loss for the corporation). Testing atmosphere.

“Well then, who? In any case, not POWERSOFT.”

“No.” Great that Brockmann wasn’t around. Oh well, Brockmann would hold him, as executive engineer, responsible for everything anyway.

“No, I’m afraid nothing has been adapted. Not that I know of. I thought...” What had he thought at the time? That software always functions, always costs too much and in any event as little a comprehensible accessory to the whole as an instruction manual. Somehow necessary, but oh well. And he perceived himself – and he was probably right – as being invariably cleverer than Brockmann, who probably believed that you buy a computer, set it up, install it and then it does its work.

“Nothing was done there.” Confession of defeat.

Koch seemed to be almost satisfied. Maybe that was a delusion and he was only satisfied that his pants had dried quickly in the desert climate. Even the phase of stickiness would soon be over with. Only the problem remained of how a software company should invoice the operator of a solar power plant for the cleaning of a pair of pants.

“Then it’s actually already clear what has happened,” he said.

“The measurement reading sensor, which measures the position of the maintenance tower, delivered values that the program was not prepared for. We were only aware of the hundred and fifty meters of track, for which the prohibited focus coordinates in the very array mentioned before were stored. If the tower were, however, to roll back further, then the positions would be extracted out of storage positions that are situated *adjacent* to this array. Above or below it, I don’t know. But, other things were situated adjacent to this array object. For example, the data objects, which receive the coordinates for the receiver and the zero focus.”

Koch stood up.

“Yeah, that’s what must have happened. We use an exchange program for the transport of these coordinates in order to reverse all data flows when we back up the tower. In this case, other programmers must have used simpler allocations. It’s become a bit unclear. I don’t think that I can trace it that quickly. By the way, you could have saved yourself a lot of trouble if you had bought the next best machine at the time.”

“Why?”

“We programmed the system in Ada.”

Koch saw that once again Lindner couldn't follow him.

“Ada is a programming language. A good programming language. It takes care that many a mistake made by the programmer is caught when the program is already running. So-called runtime-checks are generated. For example, these prevent that you're out of range when you access an array object if the index was falsely calculated. This happens in C every day.”

“Oh. C?”

“C is also a programming language. But we've used Ada. *Ada!*”

“Ada.”

“Yes. O.K. Usually you can't even make such false accesses in Ada. But at the time, you wanted to manage with the smallest machine with which you could just barely operate the control system of the power plant. Since runtime checks need time, an Ada program which compiles regularly would have required the next largest machine. The corporation didn't want to spend that much money. So: the smallest machine. In order for the control system to even run, it had to be compiled by using the compiler option “pragma SUPPRESS” – this disables all runtime checks. The program is somewhat smaller and faster. But unsafe. You see the results now.”

“Mr. Brockmann insisted on that computer,” Lindner defended himself.

“I don't care. I'm not here to get you out of this mess by putting the blame on someone. Preferably, we should consider what we should do. Did you do a regular shutdown?”

“Yes, as in the operating instructions.”

“Very good. Then the data are still on the storage unit. What time is it now? We'll boot up the system now. As I understood you before, the problem in the receiver tower is settled by now. Good. We'll boot the system again. The focus will stay at the zero focus – right now it's still the wrong coordinating point.”

Lindner was all smiles. The assuredness that Koch radiated, that the problem would be solved, was conveyed to him. Koch continued:

“Then we'll pull the maintenance tower back. In the process, it will enter the focus point once again – but you've said that its already quite damaged. We'll pull it back to the most extreme position and the program will temporarily reverse the errors. The exchange routine. Then we can focus back on the receiver and even produce a few million-kilowatt hours during the last part of the day. And after dark, we'll run another core image. I'll take a look at the listings in the meantime.”

When Lindner entered Brockmann's office a few minutes later, he radiated the confidence of victory, like only a politician who has received ten thousand votes would do.

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“OK, we won't get down there at all if it gets totally dark”, Balduin said, “I don't think that even a single electric line is functioning in the top part of the tower. But I've had a look at the door to the central shaft. It's not melted shut and there was a toolbox lying around. I could smash the door open. The door and the walls are still red-hot. But there's a strong draft once the door is opened. The emergency stairway is a type of fire escape – you can climb it without touching the railing, if you're careful. And everything further down there will be normal again anyway.”

“And there’s no light at all! I’m not going down there!” A middle-aged woman, who had already been constantly griping about society in general and Balduin in particular, started to act up again.

“Then you’ll just have to stay here. But I’ll tell you, that’s going to be very uncomfortable. A cold wind blows in the desert at night. Especially at this height! Nothing will happen to you, it will only be uncomfortable. So, who’s coming along? Who wants to sleep in a proper bed tonight and have something reasonable to eat?” Lo and behold, they all wanted to go.

“OK. After me. And be careful. It’s not pitch black as long as it’s still daytime. If we could touch the walls and the railings in the upper part, it wouldn’t be a problem. But be careful. Just ahead it’s too hot to touch. A good thing that no one is barefoot.”

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“Well, Lindner, do you think Koch will manage it?”

Brockmann stood at the window. The last light from the evening sun focused through all of the mirrors and caused the receiver to gleam in a glorious red. But you could look into the light again. Indeed, the power plant was successfully put into operation again.

“He’ll manage it. Fantastic. He sits down, doesn’t even look at the code and he knows after a few minutes where the mistake is and how to handle it temporarily.”

Lindner avoided going into the uncoordinated construction of the maintenance tower tracks.

“Funny,” Lindner said, “such bright minds, but there’s always something going wrong with the software. I wonder where that comes from.”

“Well, in any case, we’re back on line. What are we going to tell the press? The helicopter with the district attorney is already on the way.”

Both were silent. The diagnosis would most likely read technical failure. Koch would certainly keep silent. Lindner’s achievement was that he would receive a considerable remuneration. Nonetheless, thirty dead tourists. And Lindner knew that it wasn’t necessary.

“The maintenance tower was totally disabled after the first pass. We just pushed it over the edge.”

Lindner sighed as he looked at the distant maintenance tower, which looked a bit like a frayed out piece of multi-cored wire.

“Hopefully it happened quickly. To simply burn up – in a furnace – ghastly.”

He was right.