

### Lesson 7: Siting an aluminium smelter

#### Expert Briefs

#### Expert 1 – Site and location

**IMPORTANT:** As an expert, you are very keen not to give away all your knowledge. You must not offer any information unless you are asked specific questions. If someone asks you a question which is too vague, you must reply "I'm sorry, I can't answer that – can you be a little more specific?"

Site and location for the smelter is very important. You have spent a lot of time researching the best features of site for heavy industry and have advised lots of companies who have set up factories in the North of the island.

A site for this type of operation must be very flat and stable and ideally not located near mountains. There should be no chance of subsidence such as is found in old flood plains near the mouths of the two major rivers – River Northborth and River Eastwood. It is possible to stabilise land if needed but this is expensive. The best site in terms of land stability is A - Hobbytown.

Due to the high reliance on large electricity supplies, flooding is a big problem for smelters like this. You know of two such smelters worldwide which have had to be closed down due to excessive flooding in the past.

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**Expert 2 – Sea ports**

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You are an ex-dockland engineer with huge experience of port construction management and dredging technique. You have played a major role in advising the CGC on matters of importance during the construction of the heavy chemical industry plants in the north of the island.

The provision of a port near to the smelter site is very important as the main raw material must come from overseas. The tankers which bring the alumina must have a sea bed clearance of at least 16m. Any less than this would require the construction of long jetties or pipelines out into deeper water. You have seen this done but it is far from ideal and can be expensive and liable to damage from the hurricane type winds which lash the west coast.

Dredging shallow channels is also possible but, again, expensive. Dredging can only take place for location B. Any less depth would severely restrict the size of ship and hence the output from the smelter.

A good port should be sheltered and away from possible chances of high winds.

Dredging a channel is estimated to cost around £32000 per metre depth on average. The cost of new jetty constructions with all necessary hardware for transfer of the alumina is in excess of £189000 for each jetty. The provision of 2 jetties is usual – so unloading can occur without waiting for a clear jetty.

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Expert 3 – Road and rail communications

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You are a structural engineer who has worked for a long time on the island's road and rail infrastructure. You know it like the back of your hand. You are very keen not to expand the road and rail network too much as you are also a member of the island's conservation society and value the peace and quiet of the hamlets and villages near the coasts. You will try to discourage any more road or rail construction but you are not averse to suggestions to improving current road weight restrictions.

The smelter will need ample supplies of coke (carbon) and pitch for the anodes. These will need to be carried by HGV from the only port which is currently geared up to deal with it in the north of the island in the industrial region.

Currently cryolite, the solvent in the electrolysis, is imported from overseas. At present it can only be transported in the required quantities by rail. As a shareholder in the 'Cryolite Mining Development Company', you are keen to see development of the cryolite deposits in the Northern region and may even be willing to sanction construction of a dedicated rail link to a *nearby* site.

Extra cost of Railroad is estimated at £26000 per km.

Extra cost of 'A' class roads for HGV usage is estimated at £16000 per km.

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Expert 4 – Power provision

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As a former director of the island's power grid infrastructure, you are best placed to give advice on suitability of power provision.

Of the three power stations on the island, the one with the least loading and hence the most expandable is the one near the shipyard and car plant. This power station is the newest one which was built to supply energy solely to these industries. The Station in the north east of the island is hydroelectric and will only really provide power for domestic applications. Night time provision from this station is poor as it is recharging at this time.

The station to the north-west is a nuclear station providing an uninterruptible supply to the Capital city. There is a supply to the tourist centre which is just across the water from site B.

Ideally, a good site should have a secondary power source in case the primary one fails. Loss of power to the smelter would be very costly as it takes a number of days to run the plant back up to production after a power failure.

Cost for extra power cable is £15000 per km.

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**Expert 5 – Workforce provision**

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As current manager of the island's employment bureau, you are very excited about the prospect of bringing new industry to the island. Due to the recent closure of the slate mine to the west and the shipyard to the east, employment levels are very low in some regions. The lower west headland is a notorious black spot for unemployment and is the employment bureau's current focus. 'Bring Jobs To The Lower West Headland' reads the campaign slogan.

As the smelter will need a skilled workforce with a background in heavy engineering, you are keen to see the location of the smelter being close to the closed mines and shipyard. There is actually a shortage of skilled workers in the heavy industry belt near the capital city so it would be hard to find enough workers for the smelter without relocating families (on average it costs £12,000 for successful relocation of a family at the moment). The smelter will create about 1100 jobs altogether.

You have recently been approached by a Company wishing to develop a cryolite mine in the upper east quarter of the island. The company is made up from members of the management committee from the old shipyard.

You are also aware that there is financial incentive from the Central Government Committee to provide opportunities in employment deprived areas.

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Expert 6 – Markets

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You are financial advisor to the 'Chamber of Commerce' in Capital City and have detailed working knowledge of the market forces which control aluminium product demand. The current position the island is in is as follows:

- Small market for aluminium garden products located in the tourist centre to the west of the island.
- New shipyard is developing a stealth warship for export which is made primarily of aluminium alloys and therefore will require huge amounts of aluminium – up to £45000 tonnes per year. This is currently being imported from overseas. The cost saving per tonne of local production would be £700 – a huge saving.
- The car plant, currently producing cars with steel bodies is considering making the move to aluminium to reduce the huge corrosion problems on the island. There is currently no aluminium body production. There are concerns that the aluminium bodied cars will be too expensive for the local population but no research into this has been done. Maybe the new aluminium smelter will bring so much new wealth to the island that everyone will be able to afford them.
- Capital city and the nearby industrial belt has a long standing requirement for aluminium to provide chemical plant, construction material and cutlery.
- The proposed aircraft production facility will provide massive skilled employment opportunity as well as bring copious wealth to the island. Aluminium alloys such as 'duralumin' is used extensively in aircraft production due to its high strength and low density.

In conclusion, you are very excited at the prospect of a new smelter – there is certainly no shortage of market for products.

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**Expert 7 – Environmental issues**

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As leading campaigner for environmental issues on the island, you would always advise strongly against building any form of industrial plant on or near environmentally sensitive areas.

There aren't many serious environmental issues surrounding aluminium smelting. Clearly the site itself has to be large – the pot room can be many hundreds of metres long. Road and rail links will need to be built. You have heard that there is the possibility of fluorine release from the cells – maybe you can ask the ASDT about this.

As long as measures are taken to shield the environmental effects of the site and it's not built on or really near a site of environmental importance you will be happy(ish).

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**Expert 8 – Economic advisor**

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As chief economic advisor to the Central Government Committee you have been given a budget for implementation of the smelter (not including the building costs) of £3.000.000.

You also have further funding for bringing employment to deprived areas. It will certainly be an important factor in deciding on a site.