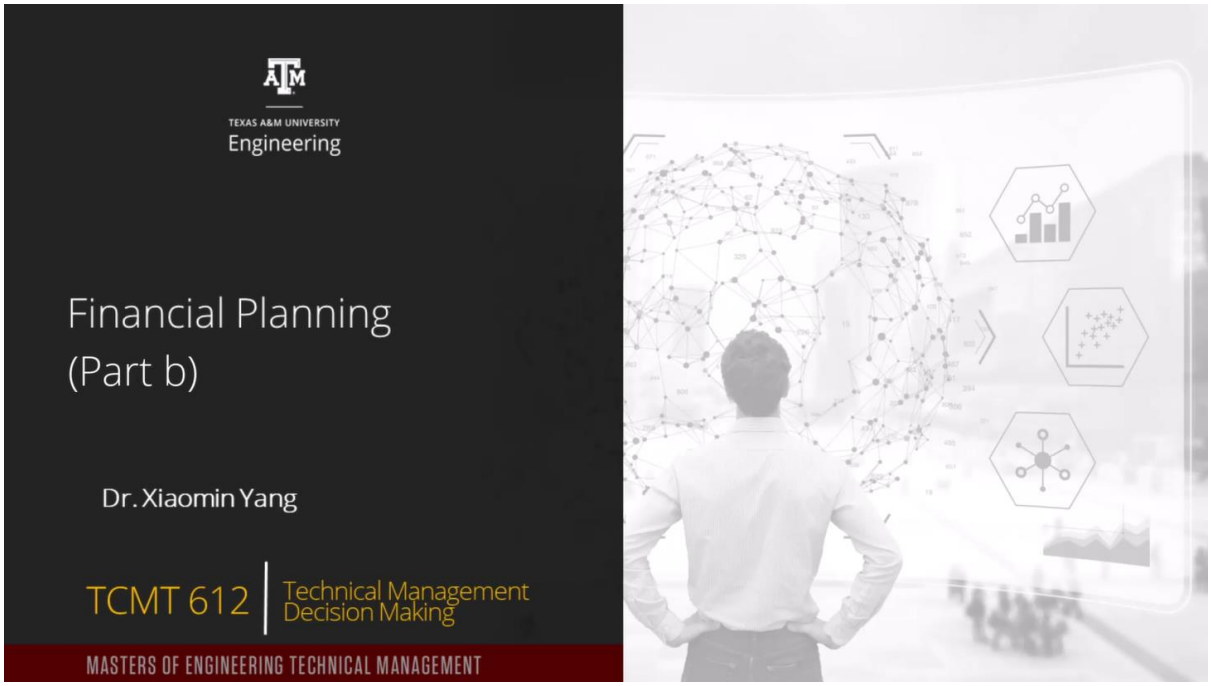
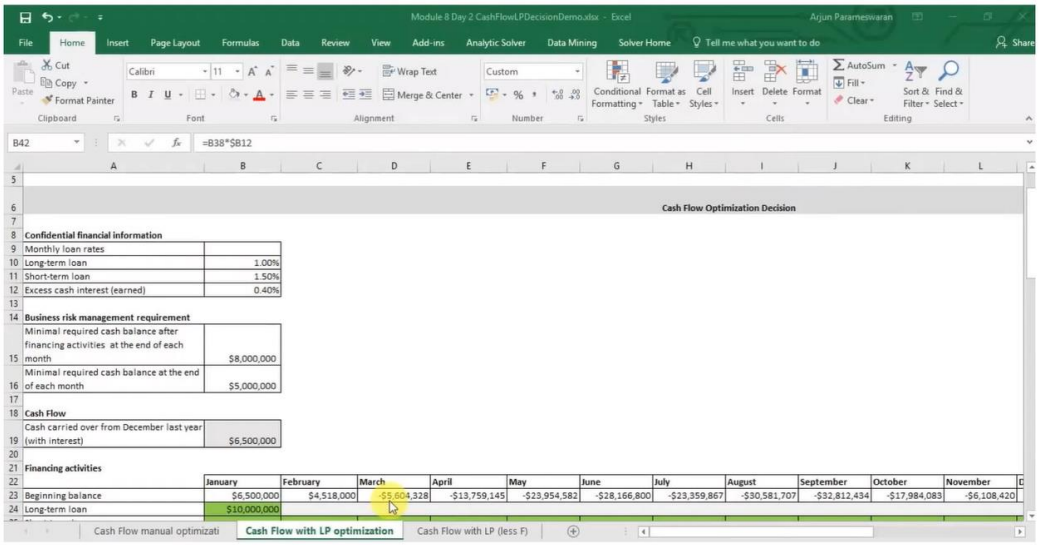
M7L5b. Financial Planning

Slide #1



Slide #2



The video clip demonstrates the Excel business model for the cash flow case.

In this example, we have been given some financial information about a company.

This particular company borrows a loan that may be a long-term or a short-term loan.

This company borrows multiple loans so that it can run its business.

Let's look at the information that is given to us.

We have the monthly loan rates.

The long-term loan is borrowed at 1% interest and the short-term loan is borrowed at 1.5% interest.

There is also an excess cash interest that is earned by the company at 0.4%.

We'll understand what these are as we go through the model.

Risk management requirement.

The management has set up a risk requirement that is minimum.

Cash balance after financing activities at the end of each month should be at least 8 million dollars and the minimum required cash balance at the end of each month should be at least 5 million dollars.

These requirements sound very similar but let's take a look at what these are while we go through the model in detail.

What we have here is the financial cash flow, the cash flow details for the company for one year.

The cash flow carried over from December last year is 6.5 million dollars.

It means that at the beginning of January, you have cash of 6.5 million dollars with you.

Let us take a look at the monthly activities here.

We have columns from January till the next January.

In this problem, we need to figure out how much loan the company has to borrow both the long-term and the short-term loans, such that the minimum risk criteria defined by the management is met and the activities of the company are carried out.

Let us take a look at how this is done.

Here, the first cell is for the beginning balance in January.

As defined in the problem, the cash carried over from December was 6.5 million dollars.

The same is the beginning balance for January.

There is no value here.

That means we need to find out the long-term loan as well as the short-term loan.

The long-term loan is borrowed for a period of one year.

Assume that you borrow it in January.

Then you'll have to repay the interest amount on the amount that you borrowed, the principal, for the next 11 months.

In the last month, you'll also have to repay the principal amount that you borrowed.

And the short-term loan is for a period of one month, that is, you borrow money this month.

And in the next month, you repay the principal as well as the interest on the amount borrowed.

We need to figure out the long-term loan that is to be borrowed.

How much should the company borrow in terms of a long-term loan?

And, if necessary, how much should it borrow in terms of short-term loans such that the total interest paid by the company is minimum?

The interest on long-term loan is one percent as defined earlier.

This would be a multiplication of the long term loan borrowed.

Let's add the sample values.

Let's say the company borrows 10 million dollars as a long-term loan and another say $50,000 as a short-term loan.

We have the figures. Let's look at how the formulas are done.

The interest on long term loan is 1% of the total amount borrowed.

This is just a multiplication of this cell.

That is the amount borrowed and the percentage at which the interest is calculated.

This is the interest on long-term loan for the amount borrowed in January.

And this is the interest on short-term loan for the amount borrowed in January, which is again a multiplication of the amount borrowed and 1.5%.

Now, let's discuss cash payback to the loan creditor.

In this case, we assume that there is no loan borrowed in the month of December for the previous year.

As I mentioned earlier, the interest would be payable starting the next month after which you borrowed the loan.

For the amount you borrowed in January, your interest repayment will be done in February.

Assuming that you have not borrowed anything in December, the loan repayment is zero in the month of January.

The balance after financial loan activities, that is, in case if you have something to pay here, if you owe something to the loan creditor, then what is the balance after you have paid them?

This is basically the difference between the initial balance at the beginning of the month.

That is the sum of the initial balance, the long-term loan and the short-term loan, minus whatever you have paid back to the loan creditors.

This is the balance after financial loan activities.

The management has defined that you need to have at least 8 million as balance after your financial activities.

That is what the greater than or equal to sign here says.

Cash flow from operations or sales is what the business incurs as a profit or a loss from whatever its operations or sales are.

In this case, for the month of January, it is a negative 12 million dollars, which means that the company has incurred a loss of 12 million dollars.

If you take a look at these numbers for the initial few months, the numbers are negative.

That is, the company is running in loss and it becomes positive after that.

So, a negative number indicates a loss and a positive number indicates a profit.

The cash balance at the end of the month is basically the sum of the balance after financial activities and the cash flow from operations or sales.

In case your company turns a profit, you'll end up with a higher figure here.

Otherwise, this is going to be less than the balance after financial activity.

This is going to be a lower number.

Again, the company has a different limit.

That is a lower limit defined that you must maintain as cash balance at the end of the month, which is 5 million dollars.

Again, this is what the constraint indicates.

And as I had mentioned in the beginning, the company also earns some amount of interest on the excess cash that it has in hand at the end of the month.

This is a product of cash balance at the end of the month and the rate of interest that is 0.4%.

For every dollar that you have excess at the end of the month, every unspent dollar that you have, you'll earn 40 cents of interest on it.

Now let us look at February. The beginning balance of February is nothing but the sum of cash balance at the end of January and the interest earned on this balance.

It is a sum of the cash that you had and the interest that you earned on that cash.

That is the beginning balance for February.

This is blank because we need the solver to tell us how much do we need to borrow.

We have sample values here.

We have not added any sample values here.

The long-term loan interest will be constant throughout the year at one percent of the total amount borrowed.

This remains at $100,000.

Interest on short-term loan is zero since you have not borrowed anything here.

This is the interest that accumulates for the month of February.

Now, cash payback to long term loan creditor is $100,000 for every month and the first payment begins in February. There is no payment in January.

Cash payback to short term loan creditor is basically the sum of the interest on short term loan and the short-term loan itself.

As mentioned earlier, the short-term loan is for a period of one month.

If you borrow $50,000 in January, you'll have to repay the $50,000 in February along with the interest accumulated on that amount.

This is the sum of $50,000 and the interest on that which is $50,750.

The calculations for January are done and the calculations for February and the rest of the year are done in a similar way.

We repay the short-term loan in the next month.

The long-term loan will be repaid at the end of the year.

This is where it is repaid.

Next January, it is the sum of the interest as well as the principal amount itself.

We have now set up our model in Excel.

This column is basically a sum of the respective rows.

This is the total long-term loan that you borrowed, total short-term loan borrowed, total interest that you paid on the long-term loan, and total interest on the short-term loan.

This is the total interest.

This is the sum of the interest on short term as well as long term loan.

And this value is what we need to optimize.

This is our objective function, and we need to find the minimum amount of loan borrowed such that the interest remains minimum.

This is the total cash payback to long term creditor and total payback to short term creditor.

This is the sum of all the cash flows.

Overall, the company runs into a profit, and this is the excess interest earned.