News Release

Japan Credit Rating Agency, Ltd.

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# Revisions of Rating Methodologies by Sector "General Heavy Machinery" and "Air Transportation"

Japan Credit Rating Agency, Ltd. (JCR) hereby announces that it has revised rating methodologies by sector "General Heavy Machinery" and "Air Transportation."

The revisions do not alter the framework, concept, treatment, or other details of the methodologies. Descriptions in the methodologies have been revised to reflect recent trends and other factors in the explanation of industry characteristics that form the backgrounds of the methodologies, or to make the explanation of the concept easier to understand. Therefore, there is no impact on individual ratings.

The revised rating methodologies will be posted on the page of “Rating Methodologies: Corporates” (https://www.jcr.co.jp/en/rrinfo/meth_corp/) of JCR’s website.

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JCR publishes its press releases regarding the rating actions both in Japanese and in English on the same day. In case that it takes time to translate rating rationale, JCR may publicize the summary version, which will be replaced by the full translated version within three business days. (Regarding Structured Finance products, JCR only publicize the summary version in English.)



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Rating Methodology by Sector

# General Heavy Machinery

## 1. Business base

General heavy machinery companies have a wide variety of businesses and product lines. Since business risks such as delivery time, profitability, and volatility are not uniform, JCR focuses on a portfolio analysis centered on their core businesses in its rating evaluation of general heavy machinery companies.

(1) Characteristics of the industry

(i) Market overview

Many of general heavy machinery companies' businesses are related to social infrastructure, transportation equipment, and corporate production facilities. First, JCR identifies which businesses are the core businesses of each company, and then analyzes the markets to which each business belongs in a multidimensional manner, focusing on those for core businesses. The analysis includes economic sensitivity (e.g., demand volatility and time lag with the business cycle), growth potential, regional characteristics (domestic, overseas, etc.), customer attributes (private/public, large specific customers, mass customers, etc.), and competitive situation. Competitive situation is discussed below in the next section (ii).

Taking social infrastructure as an example, there are two broad categories: large-scale projects mainly overseas and domestic public facilities (public demand). For the former, demand for power generation plants is likely to increase due to rising demand for electricity, especially in emerging countries. However, as the trend toward decarbonization continues, there will likely be a shift to power generation methods that emit less CO2. In addition, many high-speed railroad projects are being planned and considered in both developed and emerging countries, and this trend is expected to continue. Meanwhile, domestic demand for new public facilities (bridges, waste disposal facilities, etc.) has been sluggish, reflecting the severe fiscal situation. However, from the standpoint of safety and environment, more than a certain level of replacement demand is considered to exist. Whether overseas projects or domestic public facilities, the impact of economic fluctuations will be relatively small due to the nature of infrastructure.

(ii) Competitive situation

Competitive situation is an important factor that has a significant impact on business performance, and JCR pays attention to the competition terms and conditions and changes for each business.

Many businesses are engaged in fierce competition under free competition. However, some of them show peculiar aspects. For example, in large international projects such as power plants and high-speed railroads, there is a trend toward cooperation between companies and the governments of the countries to which they belong. On the other hand, defense-related projects such as fighter jets and naval vessels have limited



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suppliers and tend to be no-bid contracts, and competition has been relatively slow (see below).

(iii) Cost structure

Since costs are normally taken into account when receiving orders, probabilities of recovery of invested capital and securing profits are considered relatively high. However, since the weight of raw materials and equipment is generally high, a company is vulnerable to price fluctuation risk due to timing difference between receiving orders and procurement of these materials and equipment. In addition, there are many products that are difficult to shift production overseas while expanding into international markets, and a mismatch between sales and costs in terms of exchange rates is inevitable for these products, limiting the company's ability to control exchange rate risk. For each company, JCR tries to understand the degree of risk by checking the sensitivity of its business performance to these risks and its actual response to these risks, such as hedging.

Noteworthy among the individual businesses is the aircraft-related business, which differs in aspect between public and private sector demand. In the case of public sector demand, prices are determined by adding a cost fluctuation adjustment rate and a profit margin that reflects corporate efforts in terms of quality and delivery time to manufacturing costs such as raw material costs and expenses, and are therefore evaluated as a stable source of earnings. In contrast, in the case of private-sector demand, a commensurate upfront burden of development costs and capital investment is indispensable. Upfront losses are inevitable, and unless a certain level of orders for the aircraft are secured, it will be difficult to recover the capital invested. JCR does not consider the initial losses incurred in the commercial aircraft business a negative factor, and determines the medium- to long-term contribution to business performance and the probability of capital recovery each time, while updating the outlook for air transportation and demand for such aircraft.

(2) Key factors in market position and competitiveness

(i) Market position

In terms of market position, the businesses of general heavy machinery companies can be broadly divided into two categories: (a) those that have established themselves as big players and (b) those that are just one of many players. Although some of the businesses in the position (b) have a certain level of earnings strength, JCR focuses more on the status of businesses in the position (a) (most of which are core businesses) in terms of examining the strength of their business bases.

In the position (a), there are also businesses that compete intensely with other big players, albeit to a limited extent (e.g., power plants, rolling stock, motor cycles), and businesses that have a near-exclusive position due to strong relationships with specific customers (e.g., aircraft parts, defense-related businesses). Others, such as chemical plants and industrial machinery, are not necessarily big players but have established a certain position in their specialty fields or products. In each case, JCR understands demand trends for existing customers (repeat customers) and potential customers, and watches the past records of orders received and products delivered, which are the keys to deepening the relationships with existing customers



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and developing new customers.

The businesses in the position (b) are public facilities and others. Although they have little advantage in terms of scale and are forced to operate in a difficult business environment whenever demand slackens, there are some businesses that enjoy the benefits of being a survivor as a result. For these businesses, JCR is confirming the direction of future contribution to business performance, including the way the business should be conducted.

(ii) Technical strengths

Many of the general heavy machinery products require advanced technology, including in terms of safety. In addition, companies are focusing on differentiating their products with value-added features such as high efficiency and reduced $CO_2$ emissions to increase their competitiveness. In addition, the development and expansion of advanced technologies is essential not only to meet customer needs, but also to develop new markets. As competitors are making progress in technology, securing technological superiority is the basis of the general heavy machinery companies' competitiveness. JCR makes efforts to understand the position of each company's technological capabilities, centered on its core business, based on its past performance.

(iii) Cost competitiveness

Cost competitiveness is, in a sense, paired with technological strengths. No matter how high the performance of a product is, it is difficult to win the competition for orders if companies can only set a price that exceeds that added value. In addition to the price advantage that Korean and other manufacturers tend to offer, the situation is particularly difficult for Japanese manufacturers when the yen appreciates.

It is undeniable that the fixed cost burden, especially depreciation, is generally high for general heavy machinery companies, but that is not to say that there is no room for cost reduction, including productivity improvement. In addition to optimizing materials procurement, including global procurement, and optimizing product inventory management, including distribution inventory, standardization and modularization of parts are also effective, as many products are one-of-a-kind items. Furthermore, depending on supply and demand trends, a review of production bases may also be an issue for consideration. JCR confirms each company's response and its effectiveness, as well as future directions.

(iv) Project management capacity

Plants and high-speed rail systems involve significant risks as a project, and there have been cases of recording huge losses in the past. Due to their large scale, even a single project can have a tremendous impact on corporate management, making project management capacity extremely important.

Proper and accurate judgment and response are required in a wide range of areas and stages, including country risk, cost estimation, contract contents, material price and exchange rate fluctuations, project progress management, and capital recovery. In addition, it is also necessary to respond to the growing needs of customers in the areas of construction work, operations, and after-sales maintenance. JCR confirms the



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status of each company's risk management efforts, i.e., specific approaches of risk management at each of the aforementioned stages for the project.

(v) Business portfolio

In the analysis of each company’s business portfolio, JCR focuses on the length of delivery time of each business. Long delivery businesses contribute to business performance in a delayed manner and are relatively stable because sales are recorded over a long period of time. Conversely, businesses with short delivery times and mass production are more sensitive to business cycle and their performance is more volatile. In order to achieve a certain level of performance, these businesses both require continuous orders and securing a certain level of order backlog, and JCR determines these probabilities based on the status of the market of each business and competitiveness of each company, as described above.

In the long delivery core business, JCR ties to understand the sustainability of receiving orders and the direction of business performance based on market trends and competitive advantages. On the other hand, in the short delivery and mass production businesses, the average profit level and fluctuation range are assessed over the medium term, rather than short-term fluctuations in business performance. However, large short-term fluctuations are considered a risk in themselves. Based on these recognitions, in assigning a rating, JCR analyzes the characteristics of the business portfolio, which is the aggregate of each business, including the stability of performance and the risk diversification effect of multiple businesses.

While large mergers and acquisitions and investments in new business fields that have a significant impact on a company's business portfolio are a major stepping stone to growth, they also entail a certain amount of risk. JCR responds to such events to show the impact on the ratings in a timely manner after confirming their impact on business performance and financial position, as well as financial management policy.

## 2. Financial base

(1) Earnings strength

In assessing the earnings strength of general heavy machinery companies, it is necessary to pay attention to the timing of revenue recognition due to the long delivery time of each business and the burden of upfront investment. Therefore, it is necessary to understand not only the overall situation but also the situation of each business (segments are the center of practical analysis) based on the concept of a time axis. The greatest point in evaluating the rating is the contribution of the core business to the company's performance and its stability.

Key financial indicators:

- Operating income
- Amount of orders received
- Balance of orders received
- Operating margin



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(2) Cash flow generation capability

General heavy machinery companies have a generally high depreciation burden, which means that cash flow considerably exceeds profit and loss in the income statement. From the perspective of capital recovery, JCR focuses on the analysis of the balance between interest-bearing debt and cash flow.

Key financial indicators:

- Ratio of interest-bearing debt to EBITDA

(3) Safety

Interest-bearing debt tends to balloon for general heavy machinery companies because of their generally large capital expenditures and the large amount of working capital required due to the long construction period. On the other hand, there are cases where the company's equity capital is not necessarily sufficient, due in part to the losses it has incurred in the past. Considering the financing for future business development, the risk of rising interest rates, and business risks, it is desirable for the company to improve its financial structure by reducing interest-bearing debt and increasing equity capital. The rating incorporates the actual status and direction of improvement.

Key financial indicators:

- Debt equity ratio
- Equity ratio
- Shareholders' equity
- Interest coverage ratio

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Rating Methodology by Sector

# Air Transportation

## 1. Business base

Air transportation is highly important as the only transportation infrastructure that connects long distances in a short time. However, it is difficult for a company in the air transportation industry to control the major factors that affect earnings, and the industry is prone to large short-term fluctuations in earnings. For these reasons, in assigning the ratings, JCR places emphasis on how air transportation companies control their business risks. Specifically, JCR focuses on measures to increase revenues, aircraft strategies, and cost cutting initiatives.

(1) Characteristics of the industry

(i) Market overview

Social and economic trends, such as demographics and economic growth, are important in forecasting medium- and long-term trends in passenger demand. The number of passengers on domestic routes is not expected to grow significantly in the future due to the declining birthrate. In addition, the spread of remote conferencing and other factors make it difficult to anticipate an increase in business demand. On the other hand, passenger demand for international flights is expected to grow, driven by the increase in the number of foreign visitors to Japan. However, as with domestic flights, it is difficult to expect significant growth in the number of passengers departing from Japan.

In the short term, passenger demand fluctuates greatly due to factors such as terrorism, infectious diseases, and economic trends, and this is especially true for international flights. Looking at the period since 2000, there have been phases in which demand fell sharply due to events such as the September 11 simultaneous terrorist attacks in the U.S., SARS in China, global financial crisis accelerated by the collapse of Lehman Brothers, the Great East Japan Earthquake, and the COVID-19 pandemic. The impact of the COVID-19 pandemic was particularly significant, and not only was the drop in demand larger than those of previous events, but it also took time to recover.

(ii) Competitive situation

Domestic flights are in oligopoly by the two major airlines, All Nippon Airways and Japan Airlines, due to the limited number of departure and arrival slots available at Haneda Airport, a main airport. However, it is difficult to differentiate services in the air transportation industry, and since it is an equipment industry, it is prone to price competition when demand declines. In some cases, it also competes with the Shinkansen bullet train. There has been no change in the superiority of airplanes on long-distance routes, and although there are fewer plans to extend the Shinkansen, it is still necessary to check the status of speeding up and



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route development of Shinkansen.

On international routes, competition is intensifying as the number of routes served by overseas airlines increases due to the progress of open skies and the expansion of airports in the Tokyo metropolitan area, and JCR is paying attention to the trend. In particular, overseas low-cost carriers (LCCs) are increasing their presence amid growing inbound demand. Nevertheless, the dominance of the two major airlines has not been significantly declined, thanks to the high preference for Japanese airlines among Japanese passengers in addition to their securing a large number of departure and arrival slots, including those of their affiliated LCCs.

(iii) Cost structure

The air transportation industry is both an equipment industry and a labor-intensive industry that requires a high level of expertise, so the industry has a large fixed cost burden for aircraft related and labor costs. Therefore, earnings tend to fluctuate significantly in the short term in the event of sudden changes in demand due to occurrence of events.

Fuel costs, taxes and public dues (airport fees, landing fees, fuel taxes, etc.) are typical variable costs. Fuel costs, in particular, account for a large proportion of costs and are subject to large fluctuations. The two major airlines are reducing the impact of fuel costs on earnings by introducing fuel surcharge and using hedging transactions, but this does not mean that they can completely curb the impact of fuel costs.

(iv) Risks related to policies

As the importance of air transportation as transportation infrastructure is high, a certain level of support by the government, such as institutional financing, can be seen. When the COVID-19 pandemic forced a significant reduction in flights, financial assistance was provided, including reductions and exemptions of taxes and public dues. On the other hand, there are also a number of regulations governing the air transportation industry and changes in policies could affect the industry, either positively or negatively. Moreover, as airlines are expected to operate independently as private companies, it would be difficult to factor in too much government support in the event of a business downturn.

(2) Important factors in market position and competitiveness

(i) Market position

For domestic routes, it is important how many departure and arrival slots the airline can hold for routes to and from Haneda Airport, which is a source of revenue. Although the slots are periodically reviewed, the two major airlines have secured about 80% of the slots. In addition, Haneda Airport is gradually expanding the number of slots for international flights, which is expected to increase the utilization rate of domestic flights by enhancing the convenience of connecting domestic and international flights.

Similarly, securing slots at Narita Airport is important for international flights, and the two major airlines have secured a certain share, including LCCs under their umbrella. On the other hand, on international routes,



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the world's airlines are concentrated in three airline alliances, and partnerships through joint projects that go one step beyond these alliances are also being widely conducted. JCR is checking whether the airlines can maintain and improve the competitiveness of their network through global airline alliances.

(ii) Initiatives to bolster income

Business passengers tend to prioritize convenience over price compared to tourists, and the unit price is relatively high. In addition, the frequency of use by the same customer tends to be higher. For these reasons, airlines are focusing on attracting and retaining business passengers, and are working to increase their convenience, including improving services for passengers in classes with high-value seats, strengthening corporate sales activities, expanding frequent flyer program, simplifying booking and boarding procedures, and expanding route networks. JCR pays attention to whether the airlines have been successful in steadily acquiring business passengers through these initiatives.

On the other hand, with tourism demand expected to grow, especially in Asia, companies are strengthening not only full-service carriers (FSCs) but also LCCs and launching new brands. The key point is how far they can broaden their customer base while maintaining the separation of each service.

It is also important for airlines to maximize earnings by appropriately responding to fluctuations in demand by adjusting supply and fares. On the supply side, the key is to make aircraft available in line with demand. On the fare side, airlines are required to accurately forecast demand and grasp the competitive situation, and to set fares in such a way as to ensure profitability while stimulating demand. If the aircraft fleet and fares are not properly set, earnings opportunities will be lost, and a disparity in the earnings strength of companies will arise depending on their business management capabilities.

(iii) Aircraft strategies

Aircraft are the source of earnings, and JCR focuses on the aircraft fleet strategy of each airline as a matter to materialize the management strategy of each airline. In particular, aircraft strategies are very important in fuel cost reduction and growth strategies. In addition, replacement of aircraft with more fuel-efficient ones, which the airlines are promoting, plays a central role in reducing $CO_2$ emissions.

The introduction of new highly fuel-efficient aircraft can significantly reduce fuel costs. In particular, replacing large aircraft with medium and small size aircraft capable of long-distance flights can lower fixed costs on long distance routes, improving profitability per flight.

The introduction of new medium and small size aircraft is also effective in route expansion. Aircraft that can operate at low cost will enable the airlines to open new routes that were considered unprofitable in the past. Such aircraft are also expected to be effective in improving less profitable routes.

(iv) Cost cutting and safe operations

Further intensification of competition, especially on international routes, is expected in the future. In addition, fluctuations in demand due to economic fluctuation and occurrence of events are inevitable. Therefore, it is



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important to focus on further cost reductions and improve durability against changes in the external environment. On the other hand, ensuring safe operations is a top priority issue for the air transportation industry. JCR will closely monitor whether the airlines can balance cost reductions with ensuring safe operations and can avoid safety-related problems.

**2. Financial base**

(1) Earnings strength

JCR places importance on earnings strength from the perspective of the maintenance and expansion of the business. As earnings strength is susceptible to economic cycles and events, however, JCR evaluates it within a certain cycle, rather than only based on a single period of performance. When a significant change in earnings level is seen, JCR analyzes the factors behind the change, and if the change is not due to economic cycles or temporary factors, but rather structural or trending changes, JCR reflects it in its rating. While it is important for a company to earn a high level of profit during a boom period, JCR focuses more on whether the company has an earnings structure that is resilient to recession so that the downward swing of earnings can be controlled even during economic downturns.

Key financial indicators:

- Operating income
- Ordinary income
- EBITDA
- Ordinary income on sales
- ROA

(2) Cash flow generation capability

Air transportation companies are constantly raising funds for replacement with new aircraft and investment in systems, and are making investments on an ongoing basis. It is necessary to confirm whether these investments yield results as planned and the cash flow generated can be appropriately allocated to repay external debt.

Key financial indicators:

- Operating cash flow
- Free cash flow
- Ratio of interest-bearing debt to EBITDA
- Ratio of interest-bearing debt to operating cash flow

(3) Safety

Air transportation companies are subject to high earnings volatility, so it is important for them to have sufficient capital to buffer against earnings fluctuations. In addition, interest-bearing debt tends to increase due to large capital expenditures, and they also have many aircraft that are financed through off-balance



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sheet transactions. Therefore, JCR pays attention not only to interest-bearing debt on the balance sheet, but also to the status of debt, including lease transactions.

Key financial indicators:

- Shareholders' equity
- Interest-bearing debt
- Interest-bearing debt and lease obligations
- Equity ratio
- Debt equity ratio

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